IDENTITY AND SOCIAL NETWORKING SITES: THE ROLES OF ALCOHOL USE, MENTAL HEALTH, AND PERSONALITY

by

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A THESIS SUBMITTED TO THE UNIVERSITY OF BIRMINGHAM FOR THE DEGREE OF DOCTOR OF CLINICAL PSYCHOLOGY

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Thesis Overview

This thesis is submitted as part of the Doctorate in Clinical Psychology at the University of Birmingham.

Volume I: Research Component

Volume I consists of a systematic literature review, empirical research paper, and public dissemination document. The systematic review found that content on social networking sites can provide tentative information about the psychopathology and personality traits of the user. However, research displaying greater internal and external validity is required before this information could reliably inform the development of targeted online public health information or interventions. The research paper presents a study exploring the relationships between drinking identity, alcohol use, mental health symptoms, and alcohol content in social networking site pictures, in a community sample of young females. Drinking identity may be an important factor to consider in alcohol reduction and prevention efforts. The public dissemination document provides an accessible overview of the review and research paper.

Volume II: Clinical Component

Volume II consists of five Clinical Practice Reports (CPRs). CPR I presents a Cognitive-Behavioural and Systemic formulation for a 21-year-old female

experiencing low mood. CPR II presents a service evaluation of non-attendance to psychological assessment appointments in an adult community mental health setting. CPR III presents a single-case research design to assess the effects of a Positive Behavioural Support intervention with a 40-year-old female displaying behaviour that challenges. CPR IV presents a case study of Acceptance and Commitment Therapy with a 69-year-old female experiencing chronic pain and depression. CPR V presents a presentation abstract for a case study of Cognitive Behavioural Therapy with a 31-year-old female experiencing Bulimia Nervosa.

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VOLUME I: RESEARCH COMPONENT

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VOLUME I

CHAPTER I: LITERATURE REVIEW

CAN SOCIAL NETWORKING SITE CONTENT INFORM RESEARCHERS ABOUT THE PSYCHOPATHOLOGY AND PERSONALITY TRAITS OF THE USER? A SYSTEMATIC REVIEW

Abstract

Objectives

This systematic review aimed to examine research exploring whether content on social networking sites can inform researchers about the psychopathology and personality traits of the user.

Methods

A systematic search strategy on four databases; PsycINFO, Web of Science, CINAHL, and ProQuest Social Sciences Premium Collection retrieved 1180 records. Following the application of inclusion and exclusion criteria, 24 studies were identified for review and quality appraised.

Results

Individuals experiencing psychological distress may post content on social networking sites containing words relating to negative affects, health complaints, and references to depression. Individuals with subclinical narcissism may post self-promotional content and 'selfies'. Individuals with high neuroticism, often elevated in clinical samples, may post written content containing a negative valence, swear words, and first-person singular pronouns. These findings must be interpreted with caution in light of study limitations with regards to reduced internal and external validity.

Conclusions

Content on social networking sites can provide tentative information about the psychopathology and personality traits of the user. However, further research displaying greater internal and external reliability is required before a comprehensive consensus of findings can be achieved and used to inform the development of targeted online public health information or interventions. Clinicians may benefit from considering how the individuals they work with in face-to-face settings present online. This could be achieved through including social networking site use in clinical assessment protocols, or utilising standardised assessment measures which assess online behaviours.

Introduction

Rationale for Review

Social media is used by diverse groups of patients, families, staff, and stakeholders in the United Kingdom (UK). If utilised effectively, it could offer significant value to the National Health Service (NHS) (NHS Providers, 2014). Inevitably, there are challenges faced in implementing the use of new digital technologies. One of which includes focusing information, activities, and content to key individuals most directly relevant to the organisation (NHS Providers, 2014).

National surveys have identified Facebook, Twitter, and Instagram as the top Social Networking Sites (SNSs) in the UK (Department for Culture, Media, and Sport, 2016; Ofcom, 2016). In 2016, as part of their official financial statistics, Facebook reported having 1.13 billion users (Facebook Newsroom, 2016), Twitter reported having 313 million users (Twitter, 2016), and Instagram reported having 300 million users and over 95 million pictures or videos shared daily (Facebook Newsroom, 2016). SNS users often access their profiles several times a day, typically via mobile telephones (Department for Culture, Media, and Sport, 2016; Facebook Newsroom, 2016; Ofcom, 2016; Twitter, 2016).

Online technologies that monitor mental state and aim to support those in psychological distress have been trialled over recent years but have encountered difficulties. Facebook's 'Gross National Happiness Index', which estimated overall

happiness levels in different countries by assessing words in status updates (Facebook Data Team, 2011), was not deemed a valid measure of mood or wellbeing (Wang, Kosinski, Stillwell, & Rust, 2014). The mental health charity Samaritans launched a Twitter application in 2014 called 'Samaritans Radar'. It used an algorithm to detect words and phrases in a tweet thought to be associated with depression or suicide, and alerted friends of the user to the content and how to provide support (Samaritans, 2015). However, the application was withdrawn after nine days, following a petition by the general public amid data protection and privacy concerns. From 2016 Facebook allowed users to 'report a friend' who they believed might be considering suicide, with a dedicated 'protect and care' team contacting the user and providing support options (BBC, 2016).

Online technologies provide innovative methods of identifying and supporting people possibly experiencing psychological distress. However, they have faced challenges regarding reliability, validity, and data protection. Online technologies could benefit from being informed by empirical evidence in order to be clinically useful, and accurately and reliably reach individuals experiencing psychological distress. This systematic review will examine research exploring whether social networking site content can accurately inform researchers about the psychopathology and personality traits, and ultimately the state of psychological distress, of the user. An increased understanding and syntheses of this research area could help establish whether online technologies could accurately identify individuals experiencing, or at risk of experiencing, psychological distress, based on the content on their SNS profiles, and subsequently target health campaigns or

interventions to them. In addition to online considerations, an increased understanding of this research area could help inform clinicians working in face-to-face settings of aspects of online presentation and SNS use to consider with their clients.

Defining Concepts

Social networking sites. A SNS is a form of social media that allows users to create a public or semi-public profile, and communicate and interact with others (Boyd & Ellison, 2008). Facebook allows users to create a profile, share pictures, comment on other's profiles, and share short messages called 'status updates' (Facebook Newsroom, 2016). Twitter primarily allows users to send and read short messages called 'tweets' (Twitter, 2016), and Instagram allows picture and video sharing (Instagram, 2016).

Personality. The study of personality is extensive and providing a concise definition is challenging (Barone & Kominars, 1998; Moore, 2004). The trait model proposes that individuals have specific characteristics termed 'traits' that make up unique personalities (Haslam, 2007; Moore, 2004). The most dominant trait model in contemporary research is the Five-Factor Model (FFM) (Costa & McCrae, 1982), proposing that all individuals possess five core traits (see Table 1), each to differing levels and combinations (Moore, 2004).

Table 1. *Characteristics of the Five-Factor Model Personality Traits*

Personality trait	Characteristics of the personality trait
Extraversion	Sociable, lively, carefree, enthusiastic, energetic, assertive, sensation-seeking
Neuroticism	Emotionally unstable, anxious, irritable, shy, lacking self-esteem
Agreeableness	Cooperative, altruistic, warm, kind
Conscientiousness	Self-controlled, organised, reliable, thorough, efficient
Openness to experience	Intelligent, imaginative, original, curious, sophisticated

The FFM has been criticised for overstating the predictability of individuals (Mischel, 1984), the validity of its structure (Block, 1995), minimising the impact of other factors such as the environment (Matthews, Deary, & Whiteman, 2009; Moore, 2004), and due to different personality assessments providing inconsistent measurement of the traits (Matthews et al., 2009).

The FFM may not account for all potential individual differences, particularly those that are socially aversive or suggest subclinical antisocial traits (Veselka, Giammarco, & Vernon, 2014). Paulhus and Williams (2002) suggested three aversive traits in the normal range of functioning; narcissism, psychopathy, and Machiavellianism, titled the Dark Triad traits (see Table 2). The Dark Triad, alike the FFM, can be measured dimensionally (Furnham, Richards, & Paulhus, 2013; Paulhus & Williams, 2002).

Table 2. *Characteristics of the Dark Triad Personality Traits*

Personality trait	Characteristics of the personality trait
Narcissism	Grandiose, lacking empathy, elevated ego
Psychopathy	Antisocial, impulsive, selfish, remorseless
Machiavellianism	Manipulating, exploitative, lacking morals, deceptive, focused on self-interest

Psychopathology and personality. Psychopathology has been defined as the origins, development, and presentation of mental health difficulties (Rudd, 2013), and is an umbrella term that can be used to describe all types of mental illness (Leeth, 2011). Psychopathology and personality are both being considered in this review. The relationship between psychopathology and personality is complex (Widiger & Smith, 2008) and multiple models have been proposed to describe the relationship. A dominant model has not emerged, instead different models may explain different aspects of the relationship, or explain different forms of psychopathology (Millon, 1996).

Certain personality traits may predispose individuals to a greater risk of psychopathology (Krueger & Tackett, 2003; South, Eaton, & Krueger, 2010; Widiger, Verheul, & van den Brink, 1999), and may form the foundations from which psychological difficulties emerge (Gunderson, Triebwasser, Phillips, & Sullivan, 1999). The FFM traits, specifically high neuroticism, high openness, low extraversion, low agreeableness, and low conscientiousness, have been associated with a range of psychological disorders, including anxiety, depression,

and substance use disorders (Kotov, Gamez, Schmidt, & Watson, 2010; Trull & Sher, 1994). Neuroticism is consistently elevated within clinical populations (Widiger & Costa, 1994) and may play a predominant role in identifying those at risk of experiencing a clinical disorder (Gunderson et al., 1999; Krueger, Caspi, Moffitt, Silva, & McGee, 1996). Although the direction of this relationship is unclear, it is suggested that high levels of neuroticism may contribute to higher stress levels and increased vulnerability to psychological disorders (Watson, Gamez, & Simms, 2005).

Personality and psychopathology may have a dimensional relationship, existing on the same continuous spectrum (Krueger & Tackett, 2003; South et al., 2010; Widiger et al., 1999). Pathological personality may be explained as maladaptive and extreme variants of general personality traits, suggesting the FFM could be used to describe pathological personality (Costa & McCrae, 2010; Widiger, Costa, & McCrae, 2002; Widiger & Mullins-Sweatt, 2009; Widiger, Trull, Clarkin, Sanderson, & Costa, 2002). The Dark Triad traits have been found to overlap with maladaptive personality domains cited in the Diagnostic and Statistical Manual-5 (DSM-5) (Jones & Paulhus, 2014; Krueger, Derringer, Markon, Watson, & Skodol, 2012).

Psychopathology and Frequency of Social Networking Site Use

More frequent use of Facebook has been associated with greater psychological distress (Chen & Lee, 2013), reduced life satisfaction (Kross et al., 2013),

increased loneliness (Lou, Yan, Nickerson, & McMorris, 2012), bipolar disorder, and a range of personality disorders (Rosen, Whaling, Rab, Carrier, & Cheever, 2013). The relationship between frequency of use and depression has varied findings, including positive associations (Pantic et al., 2012; Rosen et al., 2013), no association (Jelenchick, Eickhoff, & Moreno, 2013), and positive associations via greater negative interactions (Davila et al., 2012), reduced 'quality' of interactions (Selfhout, Branje, Delsing, ter Bogt, & Meeus, 2009), and greater social comparison (Steers, Wickham, & Acitelli, 2014).

The associations found between frequency of SNS use and psychopathology highlight a need to explore these relationships further. The direction of association may vary, for some individuals SNS use may directly influence psychological distress (Lou et al., 2012), or indirectly influence distress by reducing factors such as self-esteem (Chen & Lee, 2013), and exposing individuals to negative interactions (Davila et al., 2012). In contrast, some individuals with mental health difficulties may engage more with SNSs due to the benefits it offers them. For example, SNSs may offer those with social anxiety a venue to communicate with others in which they feel more comfortable (Pierce, 2009). In addition, SNSs may increase feelings of connectivity, and provide a setting to make friends (Gowen, Deschaine, Gruttadara, & Markey, 2012), express experiences, express opinions on professional support and treatment (Shepherd, Sanders, Doyle, & Shaw, 2015), and gain access to facts and advice (Park, Lee, Kwak, Cha, & Jeong, 2013).

Personality Traits and Frequency of Social Networking Site Use

Personality forms part of this review because the research area exploring individual differences in SNS use has predominantly focused on personality. Greater frequency of SNS use has been associated with higher extraversion and agreeableness (Eftekhar, Fullwood, & Morris, 2014; Gosling, Augustine, Vazire, Holtzman, & Gaddis, 2011; Lee, Ahn, & Kim, 2014; Michikyan, Subrahmanyam, & Dennis, 2014; Seidman, 2013). Higher conscientiousness has been associated with spending less time on Facebook (Gosling et al., 2011) and posting fewer comments (Lee et al., 2014), but posting more pictures (Eftekhar et al., 2014). Higher neuroticism has been associated with posting more pictures (Eftekhar et al., 2014), and fewer comments (Lee et al., 2014), but has also been found to be unrelated to any Facebook activities (Gosling et al., 2011; Michikyan et al., 2014). Higher openness has been associated with more online friends and pictures (Gosling et al., 2011). Amongst the Dark Triad traits, narcissism has received the most attention regarding its relationship with SNS use. Higher narcissism has been associated with greater SNS use and more online friends, status updates, pictures, and increased online interaction (Brailovskaia & Bierhoff, 2016; Lee et al., 2014; Liu & Baumeister, 2016).

Psychopathology, Personality Traits, and Frequency of Social Networking Site Use

Studies exploring individual differences in the frequency of SNS use have begun to consider both psychopathology and personality traits. Van Zalk, Branje, Denissen, Van Aken, and Meeus (2011) found that for introverted individuals only, talking to online friends more frequently led to greater self-esteem and feelings of support, and reduced depressive symptoms. Simoncic, Kuhlman, Vargas, Houchins, and Lopez-Duran (2014) found no direct association between frequency of Facebook use and depression; however, they found that young females with higher neuroticism experienced reduced symptoms of depression when they used Facebook more frequently. Brailovskaia and Margraf (2016) found individuals with high extraversion, agreeableness, and narcissism, and low neuroticism, reported greater wellbeing, life satisfaction, resilience, and social support when they used Facebook.

Psychopathology and personality traits have been associated with the frequency of SNS use and SNS activities (e.g. uploading pictures, posting status updates); however, a clear consensus of findings has not been derived. Exploring the specific *content* of SNS activities, and not just the *frequency*, may be able to provide a greater, and more accurate, understanding of the user, which could then be used to inform the development of reliable targeted online technologies. For example, a SNS user could post 100 pictures but the *content* of these pictures

could vary considerably (e.g. 100 pictures of the user themselves or 100 pictures of the countryside).

Self-Presentation on Social Networking Sites

It is proposed that online portrayals are valid representations of user's personalities, and personality traits can be accurately predicted from viewing user's SNS profiles and activities (e.g. Back et al., 2010; Seidman, 2013; Vazire & Gosling, 2004). In a meta-analysis, Tskhay and Rule (2014) found strong evidence that observers could accurately identify extraversion, openness, agreeableness, and conscientiousness from online presentation. Although the findings for neuroticism were generally positive, the validity and reliability of judgments were generally weaker for this trait. In contrast is the theory that individuals may use SNSs for identity exploration and experimentation, and the use of self-presentation tactics may result in online portrayals representing an idealised self (Bodroza & Jovanovic, 2016; Brailovskaia & Bierhoff, 2016; Fox & Vendemia, 2016; Kim & Lee, 2011; Lee-Won, Shim, Joo, & Park, 2014; Manago, Graham, Greenfield, & Salimkhan, 2008; Michikyan et al., 2014; Valkenburg, Schouten, & Peter, 2005; Walther, 2007; Zhao, Grasmuck, & Martin, 2008).

Review Aims

This systematic review will explore research assessing the *content* that users place on their SNS profiles, including visual content (e.g. '*types'* of pictures

uploaded) and written content (e.g. specific words, phrases, and topics used). The aim of this systematic review is to answer the research question ‘can social networking site content inform researchers about the psychopathology and personality traits of the user?’.

Methods

A preliminary search was conducted to ensure a comparable review did not exist. The Cochrane Database of Systematic Reviews, the Centre for Reviews and Dissemination, the Campbell Collaboration Library of Systematic Reviews, Prospero, and bibliographic databases (PubMed, Ovid PsycINFO, Web of Science) were searched using a combination of the following search terms: “psychopathology”, “mental health”, “personality”, “content”, “self presentation”, “social media”, “social networking site”, “Facebook”, and no reviews were found. This review therefore offers an original research contribution.

Search Strategy

A systematic search for research papers was conducted on 28/01/2017 and weekly alerts were received until 24/03/2017 in order to identify newly published papers. PsycINFO, Web of Science, CINAHL, and ProQuest Social Sciences Premium Collection databases were searched using the search terms presented in Table 3. The search was limited to English language, peer-reviewed (if available), and a time period of 2006 to the present day. 2006 was chosen because this was the year Facebook became available to the general public and Twitter was launched.

Table 3. *Search Terms Used for the Systematic Search*

Search term 1	*AND*	Search term 2	*AND*	Search term 3
(*self *OR* *selves) *within two words of* (present* *OR* portray* *OR* identit* *OR* appear* *OR* construct*) *OR* (virtual *OR* online) *within two words of* (*self *OR* *selves *OR* present* *OR* portray* *OR* identit* *OR* appear* *OR* construct*) *OR* (linguistic *OR* language *OR* text* *OR* written *OR* visual *OR* photo* *OR* picture *OR* status* *OR* profile *OR* content) *within two words of* (analys* *OR* exam* *OR* investigat* *OR* explor*)		social w*ithin two words of* (media *OR* network* *OR* site *OR* website) *OR* "social networking site" *OR* "social networking website" *OR* Facebook *OR* Twitter *OR* Instagram *OR* (internet *OR* web *OR* online *OR* virtual) w*ithin two words of* (tweet* *OR* follow* *OR* friend* *OR* like* *OR* comment* *OR* status* *OR* profile)		personality *OR* "personality trait*" *OR* neuroti* *OR* openness *OR* conscientious* *OR* extraver* *OR* introver* *OR* agreeable* OR Machiavellian* *OR* narcissis* *OR* psychopathy *OR* ("big five" *OR* "five factor" *OR* "Dark Triad") w*ithin two words of* (personality *OR* model *OR* "personality model" *OR* "personality trait*") *OR* psychopatholog* *OR* depress* *OR* anxi* *OR* (mental *OR* psychological *OR* emotional) w*ithin two words of* (health *OR* illness *OR* disorder *OR* distress *OR* dysfunction *OR* disturbance *OR* wellbeing)

Note:

- *'AND'* and *'OR'* are Boolean operators used to combine search terms
- Different adjacency/proximity operators were used in different databases to search within two words:
    - PsycINFO: adj2
    - Web of Science: NEAR/2
    - CINAHL: n2
    - ProQuest Social Sciences Premium Collection: n/2

*Represents truncation (forward truncation only available in Web of Science)

Study Selection

The search retrieved 1180 records, which were screened against inclusion and exclusion criteria (see Table 4).

Table 4. *Inclusion and Exclusion Criteria for the Systematic Search*

Inclusion criteria	Exclusion criteria
• Adolescent or adult sample • Students and non-students • Any country • Empirical papers • Includes one of the popular SNSs used in the UK: Facebook, Twitter, Instagram • Written or visual SNS *content* assessed • Objective measure of SNS content (e.g. researcher accesses participants SNS profile or content is uploaded) • Psychopathology or personality measured via questionnaires or medical records	• Child sample • Non-empirical papers (i.e. opinion papers, book chapters, article commentaries, literature reviews) • Conference papers • Websites not considered a SNS (e.g. dating websites, forums, gaming websites, blogs, messaging services, professional profiles) • SNSs not used in the UK • Studies not exploring *content* (e.g. frequency of status updates or pictures, use of self-presentation tactics, motivations/reasons for SNS use) • Subjective measure of SNS content (e.g. self-report) • Psychopathology or personality estimated

After removing 217 duplicates, 963 records were screened by title and abstract. 892 records were removed due to clear indication they did not meet inclusion and exclusion criteria, leaving 71 records. 71 full-text papers were assessed for eligibility and 52 papers were removed. This comprised of 11 conference papers, 10 papers not exploring content, 10 papers with no measure of personality/psychopathology, eight papers with only a subjective measure of SNS content, four papers focusing on observers perceptions of content, five papers not including a popular UK SNSs, one paper exploring political views presented

online, one paper being a duplicate study, one paper presenting a case study, and one paper not accessible due to still being in press in March 2017. An additional five papers were identified through exploration of the reference lists, resulting in a total of 24 papers being identified for review (see Figure 1).

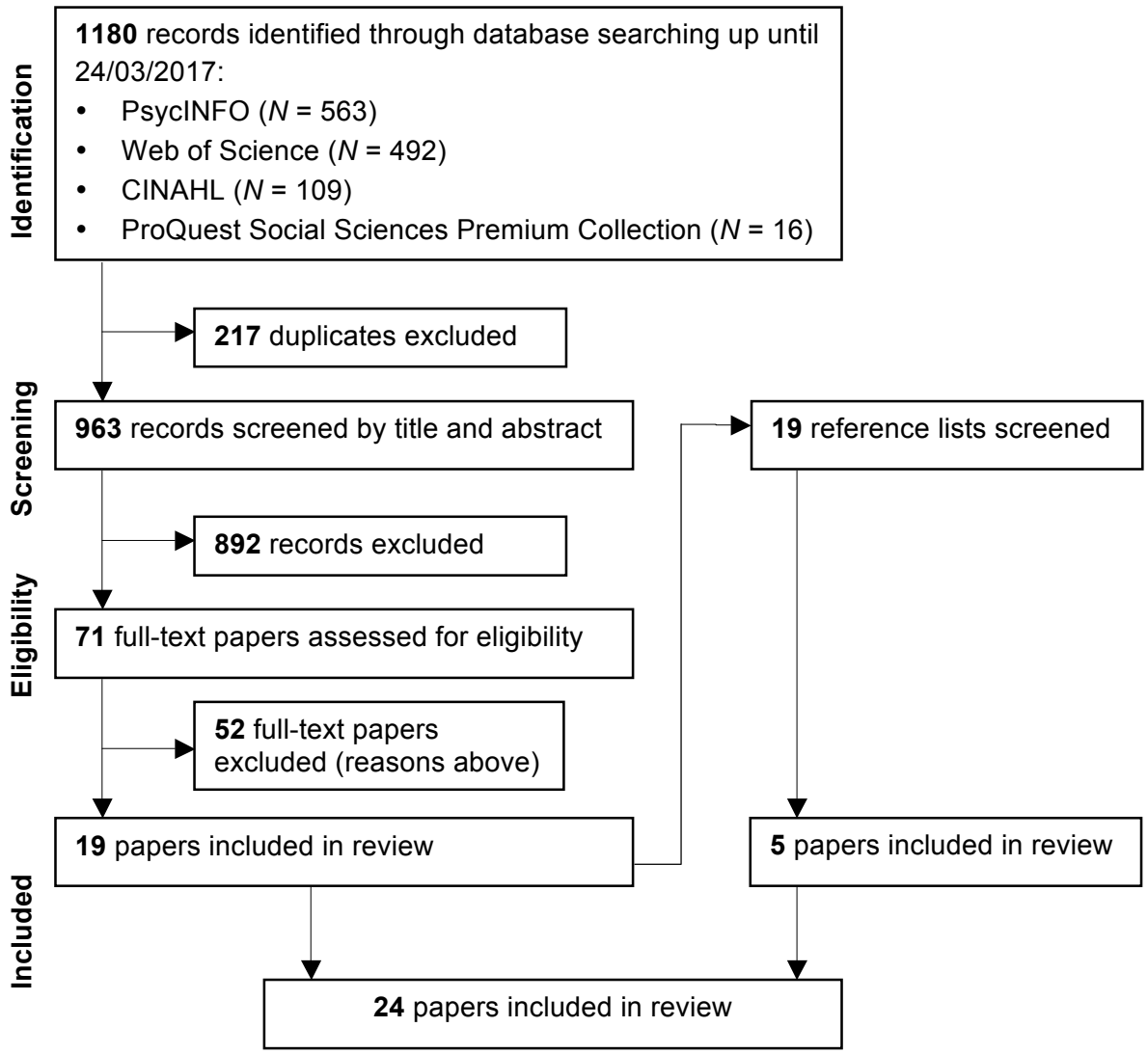

Figure 1. *Systematic Process of Study Selection*

Search Outcome

24 studies were identified for inclusion in the review. A summary of each study is presented in Table 5.

Table 5. *Summary Table of Studies Included in the Systematic Review*

	Authors (year)	Country	Sample	Student sample	Psychological construct assessed	SNS content assessed	Main findings
1	Barry, Doucette, Loflin, Rivera-Hudson, & Herrington (2017)	US	*N* = 128 (19M, 109F) Age: Range = 18-43 *M* = 20.46 *SD* = 3.59	Yes	Narcissism: • Pathological Narcissism Inventory • Narcissistic Personality Inventory	Instagram: • Selfies	• Overall proportion and frequency of selfies not related to overall narcissism or self-esteem • More selfies associated with lower 'contingent self-esteem' of the narcissism subscale • More selfies promoting physical appearance associated with higher vulnerable and grandiose narcissism • More affiliation selfies associated with lower grandiose narcissism • Selfie collages associated with higher non-pathological narcissism

	Authors (year)	Country	Sample	Student sample	Psychological construct assessed	SNS content assessed	Main findings
2	Buffardi & Campbell (2008)	US	*N* = 156 (56M, 100F) Age: Range = 18-23 *M* = 18.97 *SD* = 1.14	Yes	Narcissism: • Narcissistic Personality Inventory	Facebook: • Profile page • Pictures	Higher narcissism: • More self-promoting information in 'about me' section • More self-promoting quotes • More attractive, 'sexy', and self-promoting profile pictures • More 'fun' pictures • No relationship between narcissism and self-promoting or provocative pictures
3	DeWall, Buffardi, Bonser, & Campbell (2011)	US	*N* = 80 (25M, 55F) Age: Range = NR *M* = 18.89 *SD* = 1.03	Yes	Narcissism: • Narcissistic Personality Inventory	Facebook: • Profile page • Pictures	Higher narcissism: • More self-promoting and 'sexy' profile pictures only when low levels of first-person singular pronouns (e.g. I, me, mine) had been used to describe themselves on their profile

	Authors (year)	Country	Sample	Student sample	Psychological construct assessed	SNS content assessed	Main findings
4	Ehrenreich & Underwood (2016)	US	*N* = 125 (18M, 56F) Age: 18	Yes	Depression & Anxiety: • Child Behavior Checklist–Youth Self Report Form	Facebook: • Profile page • Pictures • Status updates	• Increased depression, anxiety, and loneliness associated with posting more about somatic complaints, requests for support, and negative affect for females only • Depression, anxiety, and loneliness not related to any content types for males
5	Fernandez, Levinson, & Rodebaugh (2012)	US	*N* = 62 (23M, 39F) Age: Range = NR *M* = 19 *SD* = 1.05	Yes	Depression & Anxiety: • Social Interaction Anxiety Scale • Beck Depression Inventory Neuroticism: • The Mini-International Personality Item Pool	Facebook: • Profile page	• Higher social anxiety associated with more lines of text in the about me, TV, music, quotes, interests, and books sections • Higher depression associated with more lines of text in the TV, music, movies, quotes, interests, and books sections • Higher neuroticism associated with more lines of text in the music, interests, and books sections

	Authors (year)	Country	Sample	Student sample	Psychological construct assessed	SNS content assessed	Main findings
6	Garcia & Sikstrom (2014)	US	*N* = 304 (132M, 172F) Age: Range = NR *M* = 24.4 *SD* = 7.52	No	Neuroticism & Extraversion: • Eysenck Personality Questionnaire Revised (short version) Dark Triad: • Narcissistic Personality Inventory (short version) • The Mach-IV	Facebook: • Status updates	• Higher psychopathy traits, narcissism, and neuroticism associated with semantic content of Facebook status updates - higher psychopathy traits displayed strongest association • Higher psychopathy traits and narcissism associated with more negative valence words and more 'odd' semantic representations

	Authors (year)	Country	Sample	Student sample	Psychological construct assessed	SNS content assessed	Main findings
7	Hall, Pennington, & Lueders (2014)	US	*N* = 100 (43M, 57F) Age: Range = 18-62 *M* = 32.3 *SD* = 12.23	Partial	FFM: • Big Five Factor Inventory	Facebook: • Profile page • Pictures • Status updates	Profile page: • Emoticons - higher extraversion • Extended letters/words - higher extraversion and neuroticism, and lower agreeableness and openness • Shorthand - lower openness • Laughter - higher neuroticism Pictures: • 'Friendly-looking' person - higher agreeableness and conscientiousness • Humour - higher agreeableness • More friends in picture - higher extraversion and lower openness • 'Friendly-looking' friends - higher agreeableness Status updates: • Political talk and relational talk - higher openness • Posting about media - lower agreeableness and higher openness • Posting about music and news - lower agreeableness

	Authors (year)	Country	Sample	Student sample	Psychological construct assessed	SNS content assessed	Main findings
8	Kern et al. (2013)	US/ Canada (85%), UK/ Europe (14%), Other (1%)	*N* = 69792 (26312M, 43480F) Age: Range = 13-65 *M* = 23.36 *SD* = 8.94	No	FFM: • Big Five Personality Factors based on the International Personality Item Pool	Facebook: • Status updates	FFM traits associated with specific topics, words, and phrases: • High neuroticism - negative valence words, low neuroticism - positive social relationships and activities that could build life balance • High extraversion - social words, low extraversion - isolated activities • High conscientiousness - achievement, relaxation, and enjoyment, low conscientiousness - computer-related words, shorthand text, and emoticons • High openness - words related to the artistic domain, low openness - low intellectual and cultural sophistication, shorthand, and misspellings • High agreeableness - well-being and religion, low agreeableness - aggression and substance abuse

	Authors (year)	Country	Sample	Student sample	Psychological construct assessed	SNS content assessed	Main findings
9	Kim, Lee, Sung, & Choi (2016)	US	*N* = 85 (gender NR) Age: Range = 20-32 *M* = 24 *SD* = 2.01	No	Narcissism: • The 13-Item Narcissism Personality Inventory	Instagram: • Selfies	• Higher narcissism predicted greater intention to post selfies which in turn predicted increased posting of selfies
10	Liu, Wang, & Jiang (2016)	Multiple Countries - NR	*N* = 5135 (gender NR) Age: NR	No	FFM: • Big Five Personality Factors based on the International Personality Item Pool	Facebook: • Status updates	FFM traits associated with specific topics: • Higher openness - religion, science, and culture, lower openness - football-related • Higher conscientiousness not associated with specific topics, lower conscientiousness - entertainment and clothing brands • Higher extraversion - travel, lower extraversion - online games • Higher agreeableness - professions such as nurses and doctors, lower agreeableness - swear words • Higher neuroticism - horror movies, lower neuroticism - religion

	Authors (year)	Country	Sample	Student sample	Psychological construct assessed	SNS content assessed	Main findings
11	McCain et al. (2016)	US	*N* = 491 (105M, 386F) Age: Range = NR *M* = 18.87 *SD* = 1.29	Yes	Dark Triad: • The 13-Item Narcissistic Personality Inventory • The Hypersensitive Narcissism Scale • The Short Dark Triad	Instagram: • Self-portrait pictures ('selfies')	• Higher narcissism associated with posting more selfies • Higher grandiose and vulnerable narcissism and higher Machiavellianism - appeared more fashionable • Higher Machiavellianism - appeared more 'sexy' and narcissistic and showed more cleavage/skin • Higher psychopathy traits - pouted lips, appeared less cheerful and more narcissistic, and smiled less • Higher grandiose narcissism - wore more make up and appeared more narcissistic, attractive, and to have higher self-esteem • Higher narcissism - appeared to have higher self-esteem • Higher vulnerable narcissism and psychopathy traits - displayed pictures that inferred sadness and disgust

	Authors (year)	Country	Sample	Student sample	Psychological construct assessed	SNS content assessed	Main findings
12	Mehdizadeh (2010)	Canada	*N* = 100 (50M, 50F) Age: Range = 18-25 *M* = 22.21 *SD* = 1.98	Yes	Narcissism: • The 16-Item Narcissism Personality Inventory	Facebook: • Profile page • Pictures • Status updates	• Higher narcissism associated with more self-promoting content in 'notes' section but not related to content in 'about me' section • Higher narcissism associated with more self-promoting content in profile pictures, other pictures, and status updates
13	Moreno et al. (2012)	US	*N* = 215 (99M, 116F) Age: Range = 18-20 *M* = 18.8 *SD* = 0.7	Yes	Depression: • Patient Health Questionnaire-9	Facebook: • Status updates	• Individuals who displayed depression references in status updates self-reported more depressive symptoms
14	Padrez et al. (2016)	US	*N* = 1008 (289M, 719F) Age: Range = NR *M* = 29.1 *SD* = 9.8	No	Depression: • ICD-10 code in medical record	Facebook: • Status updates Twitter: • Tweets	• Using words associated with depression (e.g. “depression”, “depressed”) was not related to having a diagnosis of depression • 35 (38%) of those with a diagnosis of depression posted depression-related terms • 169 (30%) of those without a diagnosis of depression posted depression-related terms

	Authors (year)	Country	Sample	Student sample	Psychological construct assessed	SNS content assessed	Main findings
15	Park et al. (2015)	Multiple Countries - NR	*N* = 66732 (24958M, 41774F) Age: Range = NR *M* = 23.4 *SD* = 8.9	No	FFM: • International Personality Item Pool	Facebook: • Status updates	FFM traits associated with specific topics, words, and phrases: • Higher openness - the artistic domain and creativity, lower openness - low intellectual and cultural sophistication, shorthand, activities, and relationships • Higher conscientiousness - positive experiences and emotions, lower conscientiousness - swear words, violence, extended letter use, and shorthand • Higher extraversion - positive emotions, enthusiasm, and sociability, lower extraversion - inward focus and tentativeness • Higher agreeableness – positive well-being, lower agreeable - swear words, hostility, and violence • Higher neuroticism – negative valence words, lower neuroticism - sports, achievements, and socialising

	Authors (year)	Country	Sample	Student sample	Psychological construct assessed	SNS content assessed	Main findings
16	Qiu, Lin, Ramsay, & Yang (2012)	US (39%), Singapore (37%), UK (11%), 20 other countries (13%)	*N* = 142 (gender NR) Age: NR	Partial	FFM: • Big Five Personality Inventory	Twitter: • Tweets	• Higher extraversion associated with words relating to social processes, positive emotions, agreeableness, religion, affect and reduced use of articles (“a”, “the”), functional words, impersonal pronouns (“it”, “those”) • Higher agreeableness and neuroticism associated with negation words (“no”, “never”) • Higher neuroticism associated with more first-person singular pronouns and conjunctions • Lower openness associated with second-person pronouns, agreeableness, positive emotion words, past tense verbs, adverbs, common adverbs, swear words, affective processes, and non-fluent words (“hm”, “erm”) • Higher openness associated with preposition words (“to”, “with”, “above”)

	Authors (year)	Country	Sample	Student sample	Psychological construct assessed	SNS content assessed	Main findings
17	Schwartz et al. (2013)	Multiple Countries - NR	*N* = 74941 (28247M, 46412F) Age: Range = 13-65 *M* = 23.43 *SD* = 8.96	No	FFM: • 20 to 100 item versions of the International Personality Item Pool proxy for the NEO Personality Inventory - Revised	Facebook: • Status updates	FFM traits associated with specific topics, words, and phrases: • Higher extraversion - social words, lower extraversion - words related to solitary activities and Japanese media • Higher openness - words related to the artistic domain, lower openness - shorthand • Lower neuroticism - words related to enjoyable social activities, higher neuroticism - words related to psychological distress and swear words • Higher agreeableness - words related to gratitude, lower agreeableness - swear words • Higher conscientiousness - words related to work/college and achievements, lower conscientiousness - swear words and text speak

	Authors (year)	Country	Sample	Student sample	Psychological construct assessed	SNS content assessed	Main findings
18	Settanni & Marengo (2015)	Italy	*N* = 201 (68M, 133F) Age: Range = NR *M* = 28.4 *SD* = 7.3	Partial	Depression & Anxiety: • Adapted Italian version of the Depression Anxiety Stress Scale-21	Facebook: • Status updates	• Lower overall wellbeing associated with posting more words relating to negative emotions, anger, sadness, and fewer positive emoticons • Higher anxiety associated with more words relating to negative emotions, anger, sadness, and negative emoticons • Higher depression associated with more words relating to negative emotions and sadness • Higher stress associated with more words relating to negative emotions, sadness, and fewer positive emotions

	Authors (year)	Country	Sample	Student sample	Psychological construct assessed	SNS content assessed	Main findings
19	Shen, Brdiczka, & Liu (2015)	US	*N* = 917 (394M, 523F) Age: Range = 18-71 *M* = 29 *SD* = 8	No	FFM: • 112 Psychological Items adopted from the International Personality Item Pool	Facebook: • Profile page	• Higher extraversion associated with using more exclamation marks • Higher neuroticism associated with negative valence words, strongly subjective words, and longer posts • Lower extraversion associated with negative valence words • Agreeableness, openness, and conscientiousness not related to content cues used
20	Smith et al. (2017)	US	*N* = 695 (181M, 514F) Age: Range = NR *M* = 28.6 *SD* = 8.9	No	Depression: • Patient Health Questionaire-2 • ICD-10 code in medical record	Facebook: • Status updates	• High-frequency Facebook posters were more likely to post about health and to have a diagnosis of depression • High-frequency posters used health-related terms such as “cough”, “headaches”, and “insomnia”

	Authors (year)	Country	Sample	Student sample	Psychological construct assessed	SNS content assessed	Main findings
21	Sorokowski et al. (2015)	Poland	*N* = 548 (218M, 330F) Age: Range = 14-47 *M* = 23.72 *SD* = 4.39	No	Narcissism: • Narcissistic Personality Inventory (polish adaptation)	Facebook: • Self-portrait pictures ('selfies')	• Posting more selfies was related to higher overall narcissism in males only, higher admiration demand-narcissism in females and higher vanity-narcissism in males • Posting more selfies with a partner was related to higher admiration demand-narcissism in females and higher leadership-narcissism in males • Posting more group selfies was related to increased narcissism of all types (overall, admiration demand, leadership, and vanity) in males, and not related to any type of narcissism in females
22	Sorokowski et al. (2016)	Poland	*N* = 548 (218M, 330F) Age: Range = 14-47 *M* = 23.72 *SD* = 4.39	No	Extraversion: • The Extraversion Scale of the NEO-Five Factor Inventory	Facebook: • Self-portrait pictures ('selfies')	• Females with higher extraversion posted more selfies with a partner, but extraversion was not related to own or group selfies • Males with higher extraversion posted more selfies with a partner and with groups, but extraversion was not related to own selfies

	Authors (year)	Country	Sample	Student sample	Psychological construct assessed	SNS content assessed	Main findings
23	Wall, Kaye, & Malone (2016)	Unclear (authors from UK & Australia)	Sample one: *N* = 92 (gender NR) Age: NR Sample two: *N* = 54 of sample one	Yes	FFM: • 50-item International Personality Item Pool Social Anxiety: • Liebowitz Social Anxiety Scale	Facebook: • Emoti-cons	• Individuals with higher agreeableness self-reported a greater use of emoticons • Higher openness was associated with posting more 'other' emoticons (e.g., 'wink' face) • Higher conscientiousness associated with reduced use of 'sad' emoticons • Self-esteem, social anxiety, and self-monitoring not associated with emoticon use

	Authors (year)	Country	Sample	Student sample	Psychological construct assessed	SNS content assessed	Main findings
24	Winter et al. (2014)	Germany	*N* = 172 (70M, 102F) Age: Range = NR *M* = 25.95 *SD* = 5.93 Uploaded statuses: *N* = 116 (44M, 72F) Age: Range = NR *M* = 25.20 *SD* = 5.30	Partial	Extraversion: • NEO-Five Factor Inventory Narcissism: • The 16-Item Narcissistic Personality Inventory	Facebook: • Status updates	• Higher narcissism associated with disclosing more intimate information • Higher narcissism associated with more self-promotional content • Extraversion not related to number of status updates or depth of self-disclosure • Lower narcissism associated with status updates containing congratulations • Higher extraversion associated with status updates containing entertainment and social life topics

Overview of Identified Studies

The studies ranged in publication year from 2008 to 2017. The majority of the studies reviewed were conducted in the United States (US) (Barry et al., 2017; Buffardi & Campbell, 2008; DeWall et al., 2011; Ehrenreich & Underwood, 2016; Fernandez et al., 2012; Garcia & Sikstrom, 2014; Hall et al., 2014; Kim et al., 2016; McCain et al., 2016; Moreno et al., 2012; Padrez et al., 2016; Shen et al., 2015; Smith et al., 2017), five were conducted across multiple countries (Kern et al., 2013; Liu et al., 2016; Park et al., 2015; Qiu et al., 2012; Schwartz et al., 2013), two in Poland (Sorokowski et al., 2015; Sorokowski et al., 2016), one in Germany (Winter et al., 2014), one in Italy (Settanni & Marengo, 2015), one in Canada (Mehdizadeh, 2010), and one unclear, although the authors were located in the UK and Australia (Wall et al., 2016).

Sample sizes varied between 54 and 74941 participants. Nine studies comprised of entirely college/undergraduate students (Barry et al., 2017; Buffardi & Campbell, 2008; DeWall et al., 2011; Ehrenreich & Underwood, 2016; Fernandez et al., 2012; McCain et al., 2016; Mehdizadeh, 2010; Moreno et al., 2012; Wall et al., 2016), four studies used partially student samples (Hall et al., 2014; Qiu et al., 2012; Settanni & Marengo, 2015; Winter et al., 2014), and 11 studies did not use student samples (Garcia & Sikstrom, 2014; Kern et al., 2013; Kim et al., 2016; Liu et al., 2016; Padrez et al., 2016; Park et al., 2015; Schwartz et al., 2013; Shen et al., 2015; Smith et al., 2017; Sorokowski et al., 2015; Sorokowski et al., 2016).

The majority of studies explored content on Facebook, although Instagram and Twitter were also explored. Seventeen studies explored personality traits (Barry et al., 2017; Buffardi & Campbell, 2008; DeWall et al., 2011; Garcia & Sikstrom, 2014; Hall et al., 2014; Kern et al., 2013; Kim et al., 2016; Liu et al., 2016; McCain et al., 2016; Mehdizadeh, 2010; Park et al., 2015; Qiu et al., 2012; Schwartz et al., 2013; Shen et al., 2015; Sorokowski et al., 2015; Sorokowski et al., 2016; Winter et al., 2014), five explored psychopathology (Ehrenreich & Underwood, 2016; Moreno et al., 2012; Padrez et al., 2016; Settanni & Marengo, 2015; Smith et al., 2017), and two explored both psychopathology and personality traits (Fernandez et al., 2012; Wall et al., 2016).

Quality Assessment

A critical appraisal of each study was undertaken in order to ascertain the quality of research, which is essential when conducting a systematic review (Sanderson, Tatt, & Higgins, 2007). There is currently no 'gold-standard' tool for quality assessment (Sanderson et al., 2007). This review utilised the National Institute for Health and Care Excellence (NICE) quality appraisal checklist for quantitative studies reporting correlations and associations (NICE, 2012) because it has shown good reliability and validity. The NICE (2012) checklist appraises the population studied, the method for selection of variables, the outcomes assessed, and the analysis conducted. An overall rating for external validity (based on population) and internal validity (based on selection of variables, outcomes, and analysis) is then given. Each area is given one of five possible grades (see Table 6).

Table 6. *Possible Grading on the NICE (2012) Quality Appraisal Checklist*

Grade	Explanation of grade
++	The study was designed/conducted in a way that minimises the risk of bias
+	The study did not address all potential sources of bias, or the answer is unclear from the way the study is reported
−	Significant sources of bias may persist
Not reported (NR)	The study did not report how they have considered the aspect in question
Not applicable (NA)	Study design aspects are not applicable to the given study design

The author critically appraised all studies and a second rater appraised a sample of five studies to reduce the risk of bias and increase reliability. Any differences in rating were discussed until 100% consensus was agreed. The final grades awarded for each study are presented in Table 7 and colour coded for ease of reading. Any sections that were collectively not applicable to all of the study designs (e.g. contamination, follow-up) were excluded from the table.

Table 7. *Ratings of Studies Using the NICE (2012) Quality Appraisal Checklist*

		1) Barry et al. (2017)	2) Buffardi & Campbell (2008)	3) DeWall et al. (2011)	4) Ehrenreich & Underwood (2016)	5) Fernandez et al. (2012)	6) Garcia & Sikstrom (2014)	7) Hall et al. (2014)	8) Kern et al. (2013)	9) Kim et al. (2016)	10) Liu et al. (2016)	11) McCain et al. (2016)	12) Mehdizadeh (2010)	13) Moreno et al. (2012)	14) Padrez et al. (2016)	15) Park et al. (2015)	16) Qiu et al. (2012)	17) Schwartz et al. (2013)	18) Settanni & Marengo (2015)	19) Shen et al. (2015)	20) Smith et al. (2017)	21) Sorokowski et al. (2015)	22) Sorokowski et al. (2016)	23) Wall et al. (2016)	24) Winter et al. (2014)
Population	Source population well described?	++	+	+	++	+	+	+	+	+	+	+	+	+	+	+	+	+	+	++	++	+	+	+	+
	Eligible population representative?	-	-	-	-	-	+	+	++	-	++	+	-	++	+	++	+	++	+	+	+	+	+	-	+
	Selected participants representative?	-	-	-	-	-	+	+	++	-	-	+	-	++	++	++	+	++	+	++	+	-	-	-	-
Method of selection	Sampling bias minimised?	-	-	-	-	-	+	-	++	-	+	+	-	+	++	++	+	++	+	++	+	+	+	-	-
	Variables based on theory?	++	++	++	++	++	++	++	++	++	++	++	++	++	+	++	++	++	++	++	+	++	++	++	++
	Confounding factors identified and controlled?	-	-	+	+	-	++	-	+	-	-	-	+	+	+	+	+	+	+	-	+	+	+	-	+
	Applicable to the UK?	++	++	++	++	++	++	++	++	++	+	++	++	++	++	++	++	++	++	++	++	++	++	++	++
Outcomes	Outcome measures and procedures reliable?	++	++	++	++	++	++	++	++	+	++	++	-	++	++	++	++	++	++	++	++	+	+	+	++
Analysis	Sufficiently powered?	-	-	-	-	-	-	-	++	-	++	+	-	+	+	++	-	++	-	+	+	+	+	-	-
	Multiple explanatory variables?	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++
	Analytical methods appropriate?	+	+	++	++	+	++	+	++	+	+	+	++	++	++	++	++	+	++	+	++	+	++	+	++
	Precision of result given/ meaningful?	++	++	+	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++
Summary	Internal validity	+	+	+	+	+	+	+	++	+	++	+	-	+	++	++	+	++	++	+	++	+	+	+	+
	External validity	-	-	-	-	-	+	+	++	-	+	+	-	++	+	++	+	++	+	++	+	+	+	-	+

Results

A qualitative synthesis of the research findings was conducted, drawing attention to important methodological considerations throughout. The study designs and methodologies varied considerably, therefore, this review focused on describing the studies, results, and limitations, through qualitative synthesis rather than meta-analysis. The research findings are presented by studies focusing on psychopathology, followed by those focusing on personality traits, and finally studies exploring both psychopathology and personality traits.

Psychopathology and Content on Social Networking Sites

Five studies (Ehrenreich & Underwood, 2016; Moreno et al., 2012; Padrez et al., 2016; Settanni & Marengo, 2015; Smith et al., 2017) explored the relationship between psychopathology and written content on SNSs. Table 8 presents a summary of the significant findings of these studies. No studies were found exploring psychopathology and visual content on SNSs.

Table 8. *Summary of Significant Findings between Psychopathology and Social Networking Site Content*

Psychopathology	Associated written content on Facebook
Overall reduced wellbeing	• Negative affect, anger, sadness, less positive emotions (Settanni & Marengo, 2015)
Depression	• References to depression (Moreno et al., 2012) • Not related to references to depression (Padrez et al., 2016) • Sadness, negative affect (Settanni & Marengo, 2015) • Somatic complaints, requests for support, and negative affect, in females only not males (Ehrenreich & Underwood, 2016) • Words relating to health complaints (Smith et al., 2017)
Anxiety	• Negative emoticons, sadness, anger, negative affect (Settanni & Marengo, 2015) • Somatic complaints, requests for support, and negative affect, in females only not males (Ehrenreich & Underwood, 2016)
Stress	• Negative affect, sadness, less positive emoticons (Settanni & Marengo, 2015)
Loneliness	• Somatic complaints, requests for support, and negative affect, in females only not males (Ehrenreich & Underwood, 2016)

Ehrenreich and Underwood (2016) found that females with symptoms of depression, anxiety, and loneliness posted Facebook status updates about somatic complaints, requests for support, and negative affects. Smith et al. (2017) obtained a similar finding in regards to somatic complaints; individuals with a diagnosis of depression posted significantly more Facebook status updates than those without depression, including status updates about health, using words such as “wide”, “sleepy”, “wake”, “insomnia”, ‘throat”, “sick”, “nose”, and “hurt”. Settanni and Marengo (2015) found that individuals with lower overall wellbeing posted Facebook status updates containing words relating to negative emotions, anger, sadness, and used fewer positive emoticons (a pictorial representation of a facial

expression, also referred to as an a 'emoji'). When exploring different components of wellbeing, they found anxiety was associated with content containing negative emotions, anger, sadness, and negative emoticons; depression was associated with negative emotions and sadness; and stress was associated with negative emotions, sadness, and fewer positive emoticons. Settanni and Marengo (2015) also found age differences, with more associations remaining in under 25-year-olds compared with over 25-year-olds. Significant results in all three studies displayed small correlations, suggesting that although statistically significant, the findings may have limited practical importance.

Ehrenreich and Underwood (2016) assessed the content of participant's status updates over a two-month period, Settanni and Marengo (2015) assessed a one-year period, and Smith et al. (2017) captured a complete history of content, all utilising an application on Facebook to capture content. Ehrenreich and Underwood (2016) utilised nine student research assistants to subjectively assess content for the presence of four features: positive affect (e.g. discussing a success or containing a positive tone), negative affect (e.g. discussing failing a test or containing a negative tone), somatic complaints (e.g. discussing physical discomfort such as headaches), and eliciting support (any explicit request for support or encouragement). The research assistants were trained until they exceeded adequate reliability standards, increasing internal validity. Smith et al. (2017) displayed a reduced risk of measurement bias through use of a computerised natural language processing technique to detect words associated with 500 topics. Settanni and Marengo (2015) also displayed a reduced risk of

measurement bias through the use of a Linguistic Inquiry and Word Count (LIWC) program to assess content. A well-validated Italian-version word dictionary was used to assess for positive words (including optimism, e.g. “happy”, “good”), negative words (including sadness, anxiety, and anger, e.g. “nervous”, “worthless”), positive emoticons (e.g. ‘smiling’ face, ‘sticking out tongue’ face), and negative emoticons (e.g. ‘crying’ face, ‘confused’ face). Unlike Ehrenreich and Underwood (2016) and Settanni and Marengo (2015) who only measured psychopathology subjectively with self-report measures, Smith et al. (2017) also accessed participants medical records for International Classification of Diseases, Tenth Revision (ICD-10) diagnostic codes, providing increased measurement reliability and reduced risk of bias.

Ehrenreich and Underwood (2016) utilised a small sample (125) of 18-year-olds only, which may have limited the generalisability of findings due to the lack of power calculation and discussion on representativeness; however, they included gender in their analysis, strengthening their findings. Settanni and Marengo (2015) obtained a sample of 201 participants recruited online across Italy via snowball sampling, which may have increased the risk of sampling bias. Smith et al. (2017) recruited participants from a US hospital emergency department, obtaining a large sample (695), however, the majority of participants were female and African American/Black, which may indicate a bias in those who chose to participate.

Moreno et al. (2012) found that individuals with higher depression scores displayed references to depression in their Facebook status updates. They found

a trend emerging that those displaying depression references were more likely to score into one of the depression categories (mild, moderate, or severe) on the depression measure, however, this was not statistically significant. In contrast, Padrez et al. (2016) found that 38% of participants who were diagnosed with depression posted words associated with depression in their Facebook status updates and Twitter tweets (e.g. “depression”, “depressed”). This was not significant, 30% of participants without a diagnosis of depression also posted these terms.

Moreno et al. (2012) utilised three trained raters to assess status updates over a one-year period against a codebook evaluating displayed depression references as defined using DSM symptom criteria, including keywords or synonyms. Although this subjective method could increase bias, inter-rater reliability was reported as good. Depression was measured subjectively with a validated self-report measure. Padrez et al. (2016) displayed increased internal validity compared to Moreno et al. (2012). Padrez et al. (2016) extracted status updates and tweets from 2009 using language processing software. A data dictionary was used to identify common terms related to 15 different health conditions, including depression, and medical records were assessed for ICD-10 codes, providing increased measurement reliability.

Moreno et al. (2012) recruited 215 college students and therefore findings can only be generalised to this population. The authors did not consider the possibility of sampling bias, which was particularly pertinent because 27% of eligible

participants did not participate. Padrez et al. (2016) showed increased external validity over Moreno et al. (2012), with a large sample (1008) recruited from a US hospital emergency department, however, participants were mostly female and African American/Black. Padrez et al. (2016) explored the possibility of sampling bias and found individuals willing to participate were slightly younger, more likely to post on Facebook daily, and more likely to attend hospital, compared with individuals who were approached and declined to participate.

Personality Traits and Content on Social Networking Sites

The majority of studies (70.83%) explored personality traits. These studies may have been limited in the data they were able to collect, or they may have chosen to focus specifically on personality traits. For ease of reading the findings are organised in to themes and results regarding the Dark Triad and FFM traits are presented in turn.

Narcissism and self-promotional content. Buffardi and Campbell (2008), DeWall et al. (2011), Mehdizadeh (2010), and Winter et al. (2014) explored 'self-promotion' (the emphasis of ones own positive attributes), and found significant associations between higher narcissism and posting self-promotional content on Facebook. The location of self-promotional content differed (see Table 9), including the profile page 'about me' and 'quotes' sections, profile pictures (Buffardi & Campbell, 2008), the 'notes' section but not the 'about me' section, profile pictures, and uploaded pictures (Mehdizadeh, 2010), and status updates

(Mehdizadeh, 2010; Winter et al., 2014). Mehdizadeh (2010) found that females engaged in more 'superficial' self-promotion via pictures and males engaged in 'descriptive' self-promotion via text. Significant results in the three studies displayed small to moderate correlations. DeWall et al. (2011) explored the relationship between narcissism and self-promotion in more depth. They found individuals with higher narcissism only displayed a self-promoting and 'sexy' profile picture when they used low levels of first-person singular pronouns (e.g. 'I', 'me', 'mine') to describe themselves on their profile page. The authors did not report the precision of associations found, reducing the ability to interpret the meaningfulness of findings.

Table 9. *Summary of Significant Findings between Narcissism and Self-Promotional Content*

Personality trait	Location of self-promotional content on Facebook
Higher narcissism	• 'About me' section (Buffardi & Campbell, 2008) • 'Quotes' section (Buffardi & Campbell, 2008) • 'Notes' section (Mehdizadeh) • Profile picture (Buffardi & Campbell, 2008; Mehdizadeh) • Profile picture only when low levels of first-person singular pronouns used in text (DeWall et al., 2011) • Other uploaded pictures (Mehdizadeh, 2010) • Status updates (Mehdizadeh, 2010; Winter et al., 2014)

Buffardi and Campbell (2008), DeWall et al. (2011), Mehdizadeh (2010), and Winter et al. (2014) all displayed satisfactory internal validity, with their subjective measurement of self-promotion reducing validity. Buffardi and Campbell (2008) and DeWall et al. (2011) both utilised five research assistants to subjectively rate the level of self-promotion in text and pictures as to how 'self-absorbed', 'self-

conscious' (reversed), 'self-important', and 'self-promoting' the Facebook user appeared, both studies reported satisfactory reliability of scales and good inter-rater reliability. DeWall et al. (2011) also used a well-validated computerised program (LIWC) to analyse the use of first-person singular pronouns, reducing the risk of bias. Winter et al. (2014) utilised five raters to rate self-promotion as 'the extent to which a post intended to present positive traits', with satisfactory reliability reported. Mehdizadeh (2010) assessed self-promotion as 'any attempt to persuade others about ones own positive attributes'. Mehdizadeh (2010) displayed the poorest internal validity as the author alone rated content and reliability was not assessed.

Buffardi and Campbell (2008), DeWall et al. (2011), Mehdizadeh (2010), and Winter et al. (2014) all used small student samples, limiting external validity in terms of generalisability. DeWall et al. (2011) utilised a sub-sample of participants who had participated in Buffardi and Campbell's (2008) study. Buffardi and Campbell (2008) failed to identify or control for any confounding variables, whereas DeWall et al. (2011) and Mehdizadeh (2010) included gender in their analysis and Winter et al. (2014) controlled for age and gender, increasing internal validity.

Dark triad personality traits and 'selfies'. Four studies (Barry et al., 2017; Kim et al., 2016; McCain et al., 2016; Sorokowski et al., 2015) explored the relationships between narcissism and 'selfies' (a self-portrait photograph) on Facebook and Instagram. Sorokowski et al. (2015) found a complex relationship

between types of selfies on Facebook (own, with partner, and with group) and subtypes of narcissism (overall narcissism, vanity narcissism, leadership narcissism i.e. a conviction that one has influence over others, and admiration demand narcissism i.e. a need to be meaningful, noticed, admired, and complimented) (see Table 10). All significant results displayed small correlations. Barry et al. (2017) found the proportion and frequency of selfies on Instagram was not related to overall narcissism or self-esteem, but similar to Sorokowski et al. (2015), small significant associations were found when exploring subscales of narcissism (see Table 10). Kim et al. (2016) found higher narcissism predicted greater intention to post selfies, which in turn predicted increased posting of selfies on Instagram, displaying small to medium effect sizes. Narcissism was more likely to predict selfie-posting behaviour than be a consequence of selfie-posting. Similarly, McCain et al. (2016) found individuals with higher narcissism posted more selfies on Instagram, and each of the Dark Triad traits were associated with appearing different to observers (see Table 10).

Table 10. *Summary of Significant Findings between Dark Triad Traits and 'Selfies'*

Personality trait	Association with selfies
Higher overall narcissism	• More selfies (Kim et al., 2016; McCain et al., 2016) • Not related to selfies (Barry et al., 2017) • More own selfies and group selfies for males only (Sorokowski et al., 2015) • Appear more narcissistic, attractive, and wear more make up (McCain et al., 2016)
Higher grandiose narcissism	• More selfies that emphasise physical appearance (Barry et al., 2017) • Appear more fashionable and to have higher self-esteem (McCain et al., 2016)
Lower grandiose narcissism	• More affiliation selfies (Barry et al., 2017)
Higher vulnerable narcissism	• More selfies that emphasise physical appearance (Barry et al., 2017) • Appear more fashionable and pictures infer sadness and disgust (McCain et al., 2016)
Lower narcissist 'contingent self-esteem'	• More selfies and selfie collages (Barry et al., 2017)
Higher admiration demand narcissism	• More own selfies and selfies with a partner for females (Sorokowski et al., 2015)
Higher vanity narcissism	• More own selfies in males (Sorokowski et al., 2015)
Higher leadership narcissism	• More selfies with a partner (Sorokowski et al., 2015)
Higher Machiavellianism	• Appear more fashionable, narcissistic, 'sexy', and show more cleavage/skin (McCain et al., 2016)
Higher psychopathy	• Appear more narcissistic, less cheerful, less smiling, more pouting, and pictures infer sadness and disgust (McCain et al., 2016)

All four studies provided limited details as to how selfies were categorised. Sorokowski et al. (2015) utilised one research assistant to subjectively count and categorise pictures. This research assistant recruited the participant via their friend list on Facebook, increasing the risk of bias. Kim et al. (2016) utilised two raters and reliability was not reported. Barry et al. (2017) utilised four raters and assessed picture captions to aid categorisation, with excellent inter-rater reliability reported. Five outliers were excluded from the sample, which the authors acknowledged might have impacted their findings. McCain et al. (2016) recorded selfies objectively through Iconosquare, a third-party application on Instagram that provides user statistics. Researchers also accessed Instagram accounts and observers rated participant's characteristics subjectively; inter-rater reliability was reported as fair. Barry et al. (2017), Kim et al. (2016), and McCain et al. (2016) could have improved internal validity by considering confounding variables.

Kim et al. (2016) and Barry et al. (2017) both utilised small samples of predominantly females, and Barry et al. (2017) utilised a student sample only, reducing external validity by limiting representativeness of SNS users. McCain et al. (2016) and Sorokowski et al. (2015) obtained samples that appeared adequate in size, and Sorokowski et al. (2015) obtained a sample varied in age.

Dark triad personality traits and semantic content. Garcia and Sikstrom (2014) found small to moderate correlations between the semantic content of status updates and psychopathy and narcissism, with the relationship with psychopathy being strongest. In particular, higher psychopathy traits and

narcissism were related to using more words with a negative valence and 'odd' semantic representations. Garcia and Sikstrom (2014) assessed the content of participant's 15 most recent status updates using computerised software, increasing measurement reliability. They included Facebook activities (e.g. number of friends, frequency of use) and each personality trait as covariates in the analysis, increasing internal validity. The sample appeared varied in a range of demographics increasing representativeness, and the sample size (304) appeared adequate.

Five-factor model personality traits and predefined cues. Six studies (Garcia & Sikstrom, 2014; Hall et al., 2014; Qiu et al., 2012; Shen et al., 2015; Sorokowski et al., 2016; Winter et al., 2014) explored the relationship between FFM traits and SNS content, assessing content for specific cues.

Garcia and Sikstrom (2014) found small and moderate associations between the semantic content of status updates and neuroticism, although this relationship was weak. Hall et al. (2014) found small and moderate associations between all five FFM traits and displaying different interests, using different text styles, discussing differing topics on profile pages and in status updates, and displaying different types of pictures (see Table 11). Shen et al. (2015) utilised a different cue list to assess content on Facebook and found small associations between each of the FFM traits and different cues (see Table 11). The only comparable cue explored was the length of posts by both Hall et al. (2014) and Shen et al. (2015), their findings, however, were inconsistent. Hall et al. (2014) found that longer posts

were associated with higher conscientiousness and lower agreeableness; and Shen et al. (2015) found they were associated with higher neuroticism. Qiu et al. (2012) utilised a different cue list to assess content on Instagram and found four out of five FFM traits correlated with linguistic cues found in tweets (see Table 11). Conscientiousness did not correlate with any of the cues, and there were certain cues that did not correlate with any traits, for example, anger, sadness, and negative emotion. Significant results showed small correlations only, limiting the practical importance. Sorokowski et al. (2015) explored 'selfies' and found different associations between selfies and extraversion compared to narcissism (Sorokowski et al., 2015). Females with higher extraversion posted more selfies with a partner, but extraversion was not related to own or group selfies. Males with higher extraversion posted more selfies with a partner and with groups, but extraversion was not related to own selfies. Finally, Winter et al. (2014) found that extraversion was not related to self-promotional content on Facebook.

Table 11. *Summary of Significant Findings between Five-Factor Model Traits and Social Networking Site Content Using Cue Lists*

Personality trait	Associated content
Higher extraversion	• Exclamation marks (Shen et al., 2015) • Extended letters/words, emoticons, positive affect (Hall et al., 2013) • Profile pictures contain more friends (Hall et al., 2014) • More group selfies in males (Sorokowski et al., 2016) • More selfies with a partner in males and females (Sorokowski et al., 2016) • Words reflecting: social processes, positive emotions, agreeableness, religion, affect (Qiu et al., 2012)
Lower extraversion	• Negative valence words (Shen et al., 2015) • Words reflecting: articles ('a', 'the'), functional words, impersonal pronouns ('it', 'those') (Qiu et al., 2012)
Higher neuroticism	• Negative valence words, longer posts, strongly subjective words (Shen et al., 2015) • Extended letters/words, laughter (Hall et al., 2013) • Semantic content (Garcia & Sikstrom, 2014) • Words reflecting: refusal, first-person singular pronouns, conjunctions ('and', 'but') (Qiu et al., 2012)
Higher agreeableness	• Extended letters/words (Hall et al., 2013) • Profile pictures look 'friendly', contain humour, and contain 'friendlier'-looking friends (Hall et al., 2014) • Words reflecting refusal ('no', 'never') (Qiu et al., 2012)
Lower agreeableness	• More words in posts, more characters in posts, posts relating to media music, and news (Hall et al., 2013) • Words reflecting exclusion ('but', 'without', 'exclude') and sexual words (Qiu et al., 2012)
Higher openness	• Listing 'books' and 'music' as interests, political talk, relational talk, media posts (Hall et al., 2013) • Words reflecting preposition words ('to', 'with', 'above') (Qiu et al., 2012)
Lower openness	• Extended letters/words, shorthand (Hall et al., 2013) • Profile pictures contain more friends (Hall et al., 2014) • Words reflecting: positive emotions, agreeableness, second-person pronouns, past tense verbs, adverbs, swear words, affective processes, non-fluencies ("hm", "er"), common adverbs (Qiu et al., 2012)
Higher conscientiousness	• Profile pictures look 'friendly' (Hall et al., 2014)
Lower conscientiousness	• More words in posts, more characters in posts, listing 'books' and 'movies' as interests (Hall et al., 2013)

Garcia and Sikstrom (2014), Hall et al. (2014), Qiu et al. (2012), and Shen et al. (2015) all used computerised software to assess content against predefined cues, increasing measurement reliability. The amount of content assessed varied between 15 most recent status updates (Garcia & Sikstrom, 2014), a one-month period (Qiu et al., 2012), and a one-year period (Shen et al., 2015). Alongside computerised software, Hall et al. (2014) trained four independent raters for 30 hours to assess content against specific cues, with some notably subjective cues such as level of 'attractiveness' with a lack of definition reported, however, good reliability was reported. Sorokowski et al. (2016) subjectively coded selfies and provided limited details of the procedure used. In addition, one research assistant who was 'friends' with the participant on Facebook assessed pictures and reliability was not reported, increasing the risk of bias. Winter et al. (2014) utilised five raters to rate self-promotion as 'the extent to which a post intended to present positive traits', with satisfactory reliability reported.

Shen et al. (2015) and Hall et al. (2014) did not control for confounding variables. Sorokowski et al. (2015) controlled for gender differences, Winter et al. (2014) controlled for age and gender, and Qiu et al. (2012) included age, gender, and ethnicity in their analysis. Garcia and Sikstrom (2014) included Facebook activities (e.g. number of friends, frequency of use) and each personality trait as covariates in the analysis, increasing internal validity. Garcia and Sikstrom (2014), Shen et al. (2015) and Sorokowski et al. (2016) all obtained large varied samples. Shen et al. (2015) considered the demographics of Facebook users and concluded their sample was somewhat consistent with the varied nature of Facebook users,

increasing external validity. It was unclear if Hall et al. (2014) and Qiu et al. (2012) utilised adequate sample sizes, and although these were partially student samples, both were varied in terms of demographics.

Five-factor model personality traits and open-vocabulary approaches. Four studies (Kern et al., 2013; Liu et al., 2016; Park et al., 2015; Schwartz et al., 2013) used an open-vocabulary approach to identify the natural occurring words and phrases in status updates associated with each of the FFM traits. Table 12 presents a summary of the significant findings in these studies.

Table 12. *Summary of Significant Findings between Five-Factor Model Traits and Social Networking Site Content Using Open-Vocabulary Approaches*

Personality trait	Associated topics and words on Facebook
Higher extraversion	• Social words and phrases, e.g. 'party', 'girls', 'can't wait', 'dinner' (Kern et al., 2013; Park et al., 2015; Schwartz et al., 2013) • Entertainment, social life, travel (Liu et al., 2016)
Lower extraversion	• Isolated activities, e.g. 'Internet', 'reading', 'computer' (Kern et al., 2013; Liu et al., 2016; Park et al., 2015; Schwartz et al., 2013) • Inward focus and tentativeness, e.g. 'probably' (Park et al., 2015)
Higher conscientiousness	• Achievement, school, and work (Kern et al., 2013; Schwartz et al., 2013) • Activities that support relaxation and balance (Kern et al., 2013) • General enjoyment (Kern et al., 2013; Park et al., 2015)
Lower conscientiousness	• Computer-related, e.g. 'Pokémon', 'YouTube' (Kern et al., 2013) • Shorthand and emoticons (Kern et al., 2013; Park et al., 2015; Schwartz et al., 2013) • Swear words, violence (Park et al., 2015; Schwartz et al., 2013) • Entertainment (Liu et al., 2016)
Higher agreeableness	• Diverse components of well-being, e.g. 'grateful', 'blessed' (Kern et al., 2013; Park et al., 2015; Schwartz et al., 2013) • Professions, e.g. 'doctors', 'nurses' (Liu et al., 2016)
Lower agreeableness	• Aggressiveness, substance abuse, hostility, swear words (Kern et al., 2013; Liu et al., 2016; Park et al., 2015; Schwartz et al., 2013)
Higher neuroticism	• Negative valence words, e.g. 'depression', 'lonely', 'stressed', 'upset', 'disappointed', 'anxiety' (Kern et al., 2013; Park et al., 2015; Schwartz et al., 2013) • Swear words (Schwartz et al., 2013) • Horror movies (Liu et al., 2016)
Lower neuroticism	• Positive social relationships, e.g. 'team' (Kern et al., 2013) • Activities that build life balance, e.g. 'sports', 'beach', 'vacation' (Kern et al., 2013; Park et al., 2015; Schwartz et al., 2013) • Achievements and socialising (Park et al., 2015) • Religion (Liu et al., 2016)
Higher openness	• Artistic domain, e.g. 'soul', 'spiritual', and creativity, e.g. 'poems', 'art' (Kern et al., 2013; Park et al., 2015; Schwartz et al., 2013) • Football, science, culture, and religion (Liu et al., 2016)
Lower openness	• Shorthand and misspellings (Kern et al., 2013; Park et al., 2015; Schwartz et al., 2013) • Relationships, e.g. 'kids', 'family', 'brother' (Park et al., 2015)

Liu et al. (2016) found that lower and higher levels of each FFM trait were associated with writing about different and exclusive topics in status updates (see Table 12). Conscientiousness was the only trait not associated with specific themes but was associated with specific words such as ‘pregnant’, ‘husband’, ‘wait’, and ‘babe’. Kern et al. (2013), Park et al. (2015), and Schwartz et al. (2013) all found that lower and higher levels of each trait were associated with writing about specific topics and using specific words in status updates, with some phrases being associated with multiple traits. Similar associations were found across the three studies (see Table 12).

Using an open-vocabulary approach means content is not assessed against predefined cues, reducing the risk of bias. Kern et al. (2013), Liu et al. (2016), Park et al. (2015), and Schwartz et al. (2013) all recruited participants via ‘MyPersonality’, a third-party application on Facebook that allows users to complete and receive results on personality assessments, with data being used in research. Although each study gave some consideration to the number of people signed up to the application, there was limited consideration of potential sampling bias. Liu et al. (2016) failed to describe how participants were selected, increasing the risk of bias. Kern et al. (2013), Park et al. (2015), and Schwartz et al. (2013) appeared to include everyone signed up to the application that met their inclusion criteria. It is likely that these studies have a large overlap in their samples; therefore it is unsurprising that they found similar results. Each study made attempts to identify and control for confounding variables, increasing internal validity.

All four studies displayed good external validity. Liu et al. (2016) included a large sample size (5135) recruited across multiple countries; however, the lack of demographic information collected restricts the ability to generalise findings. Kern et al. (2013), Park et al. (2015), and Schwartz et al. (2013) all obtained large sample sizes of over 60000 participants, varied in age and gender and from a variety of countries, increasing external validity. Kern et al. (2013) was the only study to report where participants were from, with 99% residing in Western countries.

Psychopathology and Personality Traits and Content on Social Networking Sites

Two studies (Fernandez et al., 2012; Wall et al., 2016) explored associations between written content on Facebook and both psychopathology and personality traits. Both studies analysed content against psychopathology and personality traits separately and did not explore the mediating or moderating associations between variables and Facebook content. Table 13 presents a summary of the significant findings in these studies.

Table 13. *Summary of Significant Findings between Psychopathology and Personality Traits and Content on Social Networking Sites*

Psychological construct	Associated written content on Facebook
Social anxiety	• Not related to overall frequency of emoticon use (Wall et al., 2016) • More lines of text in the about me, TV, music, quotes, interests, and books (Fernandez et al., 2012)
Depression	• More lines of text in the TV, music, movies, quotes, interests, and books sections (Fernandez et al., 2012)
Higher agreeableness	• Increased overall emoticon use, increased use of 'happy' emoticons (Wall et al., 2016)
Conscientiousness	• Higher: increased use of 'happy' emoticons (Wall et al., 2016) • Lower: increased use of 'sad' emoticons (Wall et al., 2016)
Higher openness	• Increased use of 'happy' and 'other' emoticons (Wall et al., 2016)
Higher neuroticism	• More lines of text in the music, interests, and books sections (Fernandez et al., 2012)

Wall et al. (2016) focused specifically on emoticon use. They found social anxiety and extraversion were not associated with emoticon use, but higher agreeableness was associated with a self-reported increased use. Furthermore, individuals with higher openness posted more 'other' emoticons (e.g. 'wink' face), individuals with lower conscientiousness posted more 'sad' emoticons, and individuals with higher agreeableness, conscientiousness, and openness posted more 'happy' emoticons. Fernandez et al. (2012) found that social anxiety, depression, and neuroticism were associated with using more lines of text, but in different sections of the Facebook profile (see Table 13). Significant associations in both studies showed small and moderate correlations.

Wall et al. (2016) utilised two raters to independently score the number and type of emoticons used on profiles and during a 10-minute online chat, achieving 100% consensus. Three categories of emoticons were identified ‘happy’, ‘sad’, and ‘other’; however, it was unclear how representative these were of the range of emoticons available. Fernandez et al. (2012) utilised six undergraduate students to assess content over a two-month period using a Facebook ‘profile-coding scheme’. Raters were given definitions of variables but otherwise were not trained, however, interclass correlations were reported as good to excellent, increasing reliability. Wall et al. (2016) and Fernandez et al. (2012) displayed reduced external validity due to small student samples, and Wall et al. (2016) did not report age, gender, or location of participants, reducing the generalisability of findings.

Discussion

Overview

This systematic review aimed to answer the research question 'can social networking site content inform researchers about the psychopathology and personality traits of the user?'. Findings must be interpreted with caution because of methodological concerns impacting on the internal and external validity of findings.

The results suggest that individuals experiencing psychological distress might be identified on SNSs through their use of words relating to negative affects or containing a negative valence, although this may be more prominent in individuals under 25 years old (Settanni & Marengo, 2015) and females (Ehrenreich & Underwood, 2016). They may also be identified from posting online about health complaints (Smith et al., 2017), and requests for support, although this may be more prominent in females (Ehrenreich & Underwood, 2016). Individuals experiencing depressive symptoms might make references to depression online (Moreno et al., 2012), however, this may be indicative of subjective symptoms rather than having a diagnosis of depression (Padrez et al., 2016). It would be difficult to establish levels of social anxiety from use of emoticons (Wall et al., 2016), but it may be identified, along with depressive symptoms, from individuals using more lines of text in specific sections of the Facebook profile (Fernandez et al., 2012).

The Dark Triad traits are subclinical personality traits, and have been found to overlap with maladaptive personality domains cited in the DSM-5 (Krueger et al., 2012; Jones & Paulhus, 2014). Narcissism was explored most frequently. Individuals with higher levels of self-reported narcissism might be identified on SNSs through self-promotional content in written text and pictures (Buffardi & Campbell, 2008; Winter et al., 2014). However, gender differences emerged; females may display more self-promotional pictures, whereas males may display more self-promotional text (Mehdizadeh, 2010). In addition, self-promotion might only be present in pictures if individuals have used less first-person singular pronouns to describe themselves in text (DeWall et al., 2011). An important methodological consideration was the subjective rating of 'self-promotion', which was defined slightly differently across studies.

Individuals with higher levels of narcissism might also be identified through posting more selfies on SNSs (Kim et al., 2016; McCain et al., 2016), however, this association was not clear. Different types of selfies and different subtypes of narcissism displayed different relationships (Barry et al., 2017; Sorokowski et al., 2015). These complex findings may reflect the overall complex nature of defining 'narcissism'. However, the common core of narcissist definitions, a sense of being special and more important than others (Krizan & Herlache, 2017), appeared consistent with the findings that these individuals may post content that promotes, or focuses on the self.

Narcissism, along with psychopathy, was also associated with using more words with a negative valence and 'odd' semantic representations, although the authors did not provide examples of this content limiting interpretation of findings (Garcia & Sikstrom, 2014).

Certain personality traits may predispose individuals to a greater risk of experiencing psychological difficulties (Krueger & Tackett, 2003; South et al., 2010; Widiger et al., 1999). In particular, neuroticism may play a predominant role in identifying those at risk of a clinical disorder (Krueger et al., 1996), and is found to be elevated in those with anxiety, depression, and substance disorders (Kotov et al., 2010). Individuals with high neuroticism may be identified on SNSs from their use of words with a negative valence, swear words (Kern et al., 2013; Liu et al., 2016; Park et al., 2015; Schwartz et al., 2013; Shen et al., 2015), and use of first-person singular pronouns (Qiu et al., 2012). Although research has proposed that observers can accurately perceive personality traits from SNS profiles, the validity and reliability of judgments of neuroticism have been found to be the weakest compared to other FFM traits (Tskhay & Rule, 2014). This may result in individuals with high neuroticism being more difficult to identify from their SNS content.

In addition to neuroticism, high openness, low extraversion, low agreeableness, and low conscientiousness have been found to characterise all DSM Axis I disorders (Trull & Sher, 1994). The review findings suggest that it might be possible to identify these individuals through content on their SNSs; however,

some types of content were related to more than one trait. The SNS content associated with each of the FFM traits appeared consistent with the typical characteristics of each of the traits, suggesting individuals may present online in a way that is consistent with their personalities in real-life settings. Individuals with high openness to experience (characterised by e.g. intelligence, imagination, curiosity) might be identified on SNSs from topics displaying creativity, science, religion, and culture (Kern et al., 2013; Liu et al., 2016; Park et al., 2015; Schwartz et al., 2013). Individuals displaying introverted traits (characterised by e.g. reduced sociability, liveliness, assertiveness) might be identified on SNSs from negative valence words (Shen et al., 2015), fewer selfies (Sorokowski et al., 2016), talking about isolated activities, and an inward focus (Kern et al., 2013; Liu et al., 2016; Park et al., 2015; Schwartz et al., 2013). Individuals with low agreeableness (characterised by e.g. reduced altruism, warmth, kindness) might be identified on SNSs from words and phrases displaying aggressiveness, abuse, hostility, and swear words; and individuals with low conscientiousness (characterised by e.g. reduced organisation, reliability, thoroughness, efficiency) might be identified on SNSs through the use of swear words, shorthand, and words relating to violence (Kern et al., 2013; Liu et al., 2016; Park et al., 2015; Schwartz et al., 2013).

Methodological Considerations

The majority of significant correlations were small in size, with only a few results yielding medium size correlations. This suggested that although findings were statistically significant, their meaningfulness and practical importance might be

limited, particularly for studies utilising small samples where the risk of obtaining a significant result by chance may have been heightened.

Differing methodologies resulted in difficulties synthesising findings. Closed-vocabulary approaches assessed written content against predefined cues; however, comparable cues were often not assessed. Studies that used computerised software to assess content provided greater reliability than studies that subjectively categorised content. Open-vocabulary approaches assessed naturally occurring words and phrases with computerised software, which provided greater internal validity, however, all studies using this approach recruited from the same participant pool so it was unsurprising that findings were similar. Visual content was assessed subjectively, with limited or differing definitions of concepts and an increased risk of measurement bias.

Psychopathology and personality traits were often assessed using well-validated self-report measures, however, their subjective nature may have increased the risk of measurement bias. Two studies (Padrez et al., 2016; Smith et al., 2017) measured psychopathology with ICD-10 diagnostic codes from medical records, providing a reliable measure of diagnosis, however, the absence of this in other studies was not a limitation as this review focused on the general population who access SNSs.

Some of the studies displayed concerns regarding the samples utilised. Small student samples limited the generalisability of findings to other SNS users. In

addition, incentives were often used such as course credit in exchange for participating, increasing the risk of bias. Some studies included confounding variables in analysis, such as age and gender; however, those that did not displayed reduced reliability. Confounding variables such as age and gender are particularly important in this research area because younger populations are overrepresented on SNSs, with prevalence decreasing with age (Department for Culture, Media, and Sport, 2016; Ofcom, 2016), and female Internet users are more likely to own a SNS profile compared to males (Ofcom, 2016). The majority of studies, with the exception of Shen et al. (2015), failed to explore the demographic characteristics of SNS users, resulting in difficulties establishing whether samples were representative.

Research Implications

This review provided tentative findings that SNS content can inform researchers about the psychopathology and personality traits of the user, however, concerns with internal and external validity must be acknowledged with the studies reviewed. Researchers exploring the development of new online technologies may benefit from considering how information is targeted to their intended audiences. Applications such as ‘Samaritans Radar’ (which ceases to be in use) used a specifically designed algorithm to detect words and phrases in a tweet thought to be associated with depression or suicide. If similar algorithms were to be developed they could benefit from being based on empirical evidence. This review suggests tentative findings that certain words and phrases, and certain types of

pictures, could be used to detect individuals experiencing psychological distress, or at risk of experiencing psychological distress by considering their personality traits. However, given the limitations of the studies it is suggested that further research is required to develop a more comprehensive consensus of findings before this can reliably inform new technologies.

Future studies should aim to reduce the subjective measurement of variables, with greater attention paid to defining concepts measured. If future studies are to use closed-vocabulary approaches they should aim to measure the same variables by utilising comparable cues. Using comparable cues could improve opportunities to synthesise findings. In addition, gender and age differences were identified in several of the studies, and future research could strengthen their findings by considering these in analysis. Personality traits were explored more frequently than psychopathology, highlighting a particular need for more research within this area. In addition, it may be beneficial to explore the moderating or mediating relationships between psychopathology and personality and their relationships to SNS content, given the proposed links between these psychological constructs. The three most popular SNSs were included in this review but only two studies explored Twitter (Padrez et al., 2016; Qiu et al., 2012), and three studies explored Instagram (Barry et al., 2017; Kim et al., 2016; McCain et al., 2016), none of which explored psychopathology on these SNSs. If resources similar to ‘Samaritans Radar’ were considered for use on Twitter and Instagram then it would be beneficial to conduct more research on these SNSs.

Clinical Implications

Campaigns such as 'Time to Change', which aim to reduce mental health stigma and discrimination and promote expressing difficulties and seeking support (Time to Change, n.d.), are well established online. Campaigns such as these, public health information, or psycho-educational material, could be targeted online to individuals at risk of experiencing psychological distress based on the content they present online, in a similar way that products can be advertised to specific targeted audiences (Facebook, n.d.). Although targeting information and advice may be a cost-effective method of promoting public health, a range of ethical issues would need to be considered in terms of how SNS users consent to their information being used in this way.

Targeted public health campaigns and health behaviour change interventions have shown potential in physical health domains (e.g. Huesch, Galstyan, Ong, & Doctor, 2016; Yang, 2017). In addition, public health information that is tailored to individuals based on their personality has been shown to be more effective at behavioural change (Skinner et al., 1994). Online psychological interventions have also shown promise, such as internet-based Cognitive Behavioural Therapy for anxiety and depression (Andrews, & Williams, 2015; Pasarelu, Andersson, Nordgren, & Dobrean, 2016), somatic complaints (Van Beugen et al., 2014), insomnia (Zachariae, Lyby, Ritterband, & O'Toole, 2016), and posttraumatic stress disorder (Sijbrandij, Kunovski, Cuijpers, 2016). The findings of this review propose

that further higher quality research is required before SNS content can be utilised to accurately target information and interventions to individuals online.

Aside from online considerations, this review offers interesting considerations for clinicians working in face-to-face settings. In these settings, clinicians may be hesitant to see the importance of their client's online behaviour, particularly as this is a novel area to explore. However, given the high proportion of individuals, particularly young people, accessing SNSs several times a day, these online settings may play an important role in many people's lives.

This review proposes that the content individuals present on SNSs may reflect their psychopathology and personality traits, however, the motivation behind displaying different types of content, and whether the expression of certain content reduces or increases psychological distress, was beyond the scope of this review. Increased psychological distress was found to be associated with the use of words with a negative valence, making references to depression, and expressing somatic complaints. These findings suggest that some individuals may use their SNS profiles as a tool to express their emotions and difficulties, and seek support or acknowledgement from others. From a behavioural perspective, positive reactions or support gained from online friends could be reinforcement for displaying more of this content in the future. Self-expression on SNSs could lead to problematic or excessive use when it is viewed as an important or exclusive method of relieving stress, loneliness, and depression (Xu & Tan, 2012). Young people with increased psychological vulnerability, life stress, and limited family and social support

(Echeburua & de Corral, 2010), and those with higher narcissistic traits (La Barbera, La Paglia, & Valsavoia, 2009), may be particularly prone to problematic SNS use. From a Cognitive-Behavioural perspective, problematic SNS use may occur when maladaptive cognitions, perpetuated by various environmental factors, lead to compulsive use due to positive experiences received online acting as a reinforcing factor for use (Turel & Serenko, 2012).

Clinicians may wish to consider how the individuals they work with present online and the motivation behind presenting specific content. It may be beneficial if clinical assessment protocols included questions about SNS use, to ensure this topic is elicited if relevant to the client. In addition, standardised assessment measures designed to assess online behaviours or problematic internet or SNS use, such as the Psycho-Social Aspects of Facebook Use Questionnaire (Bodroza, & Jovanovic, 2016), the Internet Addiction Test (Young, 1998), the Pathological Internet Use Scale (Johansson & Götestam, 2004), or the Facebook Addiction Scale (Sofiah, Zobidah, Bolong, & Osman, 2011), could be beneficial in supplementing information gathered in clinical interviews. If problematic SNS use is identified, appropriate psychological interventions, or adaptations to interventions, could be considered. These considerations are beyond the scope of this review, however, motivational interviewing (Miller & Rollnick, 2002; Şenormancı, Konkan, & Sungur, 2012), controlled use and gradual exposure, followed by relapse prevention strategies informed by Cognitive-Behavioural techniques (Echeburua & de Corral, 2010), or Acceptance and Commitment

Therapy (Şenormancı et al., 2012) may be effective at reducing problematic SNS use.

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VOLUME I

CHAPTER II: EMPIRICAL RESEARCH PAPER

DRINKING IDENTITY AND ALCOHOL USE IN YOUNG FEMALES: THE RELATIONSHIPS BETWEEN MENTAL HEALTH AND DISPLAYING ALCOHOL IN SOCIAL NETWORKING SITE PICTURES

Abstract

Objectives

To explore the relationships between drinking identity, alcohol use, mental health, and displaying alcohol content in social networking site pictures, in a community sample of young females.

Methods

398 female participants aged 18 to 24 years old (*M* = 20.08, *SD* = 2.11) were recruited on Facebook. Participants completed a self-report online survey, assessing drinking identity, alcohol use, and mental health. 142 of these participants uploaded their social networking site profile pictures, which were assessed for alcohol content.

Results

Young females with a greater drinking identity engaged in greater hazardous alcohol use and were more likely to binge drink. Young females experiencing greater symptoms of depression and anxiety engaged in greater hazardous alcohol use. Drinking identity moderated the relationship between depressive symptoms and hazardous alcohol use, although the results for anxiety were less conclusive. Depressive and anxiety symptoms were not associated with binge drinking status. Young females who self-reported having alcohol content in social networking site pictures engaged in greater hazardous alcohol use and were more likely to binge drink. 10.56% of uploaded profile pictures contained alcohol

content; therefore the ability to draw conclusions was limited.

Conclusions

Drinking identity may be an important factor for clinicians to consider when working with individuals who engage in problematic alcohol use, and those who experience co-morbid mental health difficulties. Alcohol use reduction and prevention efforts may benefit from considering drinking identity, as shifts in identity may influence behavioural change. Alcohol content in social networking site pictures may only provide a weak measure of drinking behaviours.

Introduction

Drinking Identity and Drinking Behaviour

It may be possible to predict the likelihood of an individual engaging in a particular behaviour by how strongly they identify with the behaviour (Charng, Piliavin, & Callero, 1988; Fekadu & Kraft, 2001). Identity can be defined as an individual's implicit and explicit responses to the question "who are you?" (Vignoles, Schwartz, & Luyckx, 2011). Identity related to alcohol has been defined as the extent to which a person thinks of himself or herself as a 'drinker' (Conner, Warren, Close, & Sparks, 1999), often termed drinking identity in research.

Drinking identity has been explored using two methods; self-report measures capturing explicit drinking identity (capturing more controlled and reflective cognitive processes) and computerised reaction time tasks measuring implicit drinking identity (capturing more automatic and reflexive cognitive processes) (Lindgren, Ramirez, Olin, & Neighbors, 2016).

A greater explicit drinking identity in students has been associated with greater alcohol use (Foster, Yeung, & Neighbors, 2013; Foster, Yeung, & Quist, 2014), greater binge drinking (Foster et al., 2014; Gardner, de Bruijn, & Lally, 2012), greater alcohol-related problems (Foster et al., 2014), lower self-efficacy to refuse drinks (Foster, Neighbors, & Young, 2014), and has been found to mediate the relationship between drinking motives and alcohol use (Foster, 2014). The

relationship between explicit drinking identity and alcohol use has been found to be stronger in males and individuals with lower decisional balance (Foster et al., 2014), and is moderated by individualism (Foster, Yeung, & Quist, 2014), and self-control (Foster, Young, & Barnighausen, 2014).

A greater implicit drinking identity in students has been associated with greater alcohol use (Foster, Neighbors, & Young, 2014; Gray, LaPlante, Bannon, Ambady, & Shaffer, 2011; Lindgren et al., 2013; Lindgren, Neighbors, Wiers, Gasser, & Teachman, 2015; Lindgren, Foster, Westgate, & Neighbors, 2013; Lindgren et al., 2016a; Lindgren, Neighbors, Westgate, & Salemink, 2014), greater alcohol-related problems and cravings (Lindgren et al., 2013), and an increased risk of experiencing an alcohol use disorder (Lindgren et al., 2016a).

Lindgren, Ramirez, Olin, and Neighbors (2016) explored both implicit (computerised task) and explicit (self-report) drinking identity in students and found both uniquely predicted greater alcohol use and alcohol-related problems, with the explicit measure being the strongest and most consistent predictor. Given the associations found, drinking identity could be an important factor to consider in alcohol prevention and reduction efforts (Lindgren et al., 2016b). Due to student samples frequently being utilised, it is unclear if these relationships exist outside of student populations.

Prevalence of Alcohol Use

A national survey in Great Britain in 2014 found that 58% of adults consumed alcohol over the previous week (Health and Social Care Information Centre, 2016). Males were consistently more likely to consume alcohol, and to higher quantities, than females (Office for National Statistics, 2016a). On their heaviest drinking day, 16 to 24-year-olds consistently consumed greater quantities of alcohol than any other age group (Office for National Statistics, 2016a).

Binge drinking is a pattern of alcohol use where a large amount of alcohol is consumed in one sitting. The amount of alcohol that constitutes a 'binge' is defined differently across the world, and for different genders. In the United Kingdom (UK) binge drinking is defined as drinking six or more units of alcohol in one sitting for females and eight or more units for males (Office for National Statistics, 2016a). In the United States (US) binge drinking is when an individual's level of blood alcohol concentration reaches 0.08 grams percent or above, typically occurring when a female consumes four or more 'standard' (half an ounce of alcohol) alcoholic drinks and a male consumes five or more, in a two-hour period (National Institute of Alcohol Abuse and Alcoholism, 2004). A survey in the UK found that 28% of the population engaged in binge drinking (World Health Organisation, 2014a), including 18% of young adults aged 16 to 24 years old, a higher frequency than any other age group (Office for National Statistics, 2016a).

Harms Associated with Alcohol Use in Females

Heavy alcohol use can have negative consequences in physical, psychological, and social domains for both males and females. In 2014, 1.1 million hospital admissions and 6831 deaths in the UK were attributed to an alcohol-related disease, injury, or condition (Health and Social Care Information Centre, 2016). Although alcohol use is generally lower in females than males, the composition of the female body (e.g. lower total body water, alcohol metabolism, the effects of oestrogen levels) may place females at greater risk of certain alcohol-related problems at lower quantities of use (Bradley, Badrinath, Blush, Boyd-Wickizer, & Anawalt, 1998; Centers for Disease Control and Prevention, 2016; Wilsnack, Wilsnack, & Wolfgang Kantor, 2014). The risk of alcohol-related harm to males is also important and warrants further research, however, because of the gender differences in levels of alcohol consumption and alcohol-related harms this study will have a specific focus on exploring alcohol use in females.

Heavy alcohol use can affect female's menstrual cycle and reproduction hormone function (Mendelson & Mello, 1988; Wilsnack, Klassen, & Wilsnack, 1984), and impact on fertility (Bradley et al., 1998). During pregnancy, alcohol use can lead to an increased risk of miscarriage and poor health of babies (Ornoy & Egaz, 2010; Plant, 2008). Binge drinking has been associated with an increased risk of unintended pregnancy (Naimi, Lipscomb, Brewer, & Gilbert, 2003; Plant, 2008; Thomas et al., 2001), spontaneous abortion (Bradley et al., 1998), and increased risk of contracting a sexually transmitted disease (Thomas et al., 2001). Heavy

alcohol use in females has been associated with an increased risk of physical assault (Plant, 2008; Wilsnack et al., 2014), and a bidirectional relationship with sexual assault or victimisation (Griffin, Umstattd, & Usdan, 2010; Kalmakis, 2010; Mohler-Kuo, Dowdall, Koss, & Wechsler, 2004; Testa & Livingston, 2009). Alcohol use has also been associated with offending behaviours such as driving whilst under the influence of alcohol and violence (McMurran, Riemsma, Manning, Misso, & Kleijnen, 2011).

In females, associations have been found between alcohol use and hypertension (Bradley et al., 1998; Briasoulis, Agarwal, & Messerli, 2012), stroke (Bradley et al., 1998), breast cancer (Bradley et al., 1998; Brooks & Zakhari, 2013; Scoccianti, Lauby-Secretan, Bello, Chajes, & Romieu, 2014; Seitz, Pelucchi, Bagnardi, & La Vecchia, 2012; Smith-Warner et al., 1998), and a range of other cancers (Allen et al., 2009). In contrast, light to moderate alcohol use has been associated with a reduced risk of some cardiovascular difficulties, strokes, and reduced weakening of bones (Wilsnack et al., 2014).

Alcohol Use and Mental Health

In 2014, 19% of alcohol-related hospital admissions in the UK were due to mental and behavioural disorders (Health and Social Care Information Centre, 2016). Associations between substance disorders, including alcohol, and mental health difficulties have been well established with large sample studies (e.g. Grant et al., 2004; Kessler et al., 1997; Regier et al., 1990). Four models have been proposed

to explain the nature of this relationship; a causal model (e.g. mental health difficulties cause substance difficulties or vice versa), an indirect causal model (e.g. substance use leads to job loss that leads to depression), a common factor model (similar etiological factors, genetics or environmental factors result in the occurrence of both disorders), or a bidirectional causal relationship (both disorders impact upon one another) (Moggi, 2005). There are a range of social and cultural factors associated with both alcohol use and mental health difficulties. Individuals with greater exposure and vulnerability to adverse social, economic, and environmental circumstances are at greater risk of certain mental health difficulties (World Health Organisation, 2014b). Individuals with greater social inequality disproportionately experience common mental health difficulties such as depression and anxiety (Melzer, Fryers, & Jenkins, 2004; Patel et al., 2010; Patel & Kleinman, 2003). Individuals with lower socio-economic status also typically drink larger quantities of alcohol (Huckle, You, & Casswell, 2010). In addition, greater alcohol use has been associated with factors such as exposure to discrimination in terms of race, ethnicity, gender, and sexual orientation (McCabe, Bostwick, Hughes, West, & Boyd, 2010), and linked with cultural norms and beliefs (Sudhinaraset, Wigglesworth, & Takeuchi, 2016). The social and cultural factors associated with both alcohol use and mental health difficulties may offer an additional explanation for why these difficulties co-occur.

Alcohol use has been associated with a range of mental health difficulties for both males and females (Lynskey & Agrawal, 2008; Piran & Gadalla, 2007; Prescott, Aggen, & Kendler, 2000; Saban & Flisher, 2010; Tidemalm, Långström,

Lichtenstein, & Runeson, 2008; Wilsnack, Wilsnack, Kristjanson, Vogeltanz-Holm, & Windle, 2004). Binge drinking has been associated with depression and anxiety (Martinez-Hernaez, 2015), and greater overall psychological distress (Woo & Wang, 2017). Social anxiety has been associated with reduced alcohol use, possibly due to avoidance of social situations, but greater alcohol-related problems, such as drinking to cope and conform (Schry & White, 2013). Individuals with social anxiety might use alcohol to reduce anxiety (Carrigan & Randall, 2003) and feel comfortable in social situations (Thomas, Randall, & Carrigan, 2003).

Heavy alcohol use in females has been associated with reduced wellbeing (Tran, Clavarino, Williams, & Najman, 2016), and a range of affective, anxiety, and somatoform disorders (Flensborg-Madsen et al., 2011), with stronger associations found in females compared to males (Bott, Meyer, Rumpf, Hapke, & John, 2005). In females, binge drinking has been associated with poorer mental health (Timko, Sutkowi, Pavao, & Kimerling, 2008), panic disorder, posttraumatic stress disorder (Chou, Liang, & Mackenzie, 2011; Timko et al., 2008), anxiety, and depression (Strine et al., 2008; Timko et al., 2008). The relationship between binge drinking and depression is stronger in females than males (Graham, Massak, Demers, & Rehm, 2007).

Given the relationships found between alcohol use and a range of physical, social, and psychological implications, the risk of alcohol-related harm to females is considered a public health concern (World Health Organisation, 2014a).

Drinking Identity and Displaying Alcohol Content on Social Networking Sites

Ziller (1990) identified a novel method of exploring general identity by using photographic essays to answer the question “who are you?”. This method has been used to explore drinking identity, conceptualised as the number of pictures containing alcohol content (Dollinger, 1996). Photographic drinking identity has been associated with greater alcohol use (Casey & Dollinger, 2007; Dollinger, Rhodes, & Corcoran, 1993). A similar approach has been used to explore drinking identity on Social Networking Sites (SNSs), such as Facebook. Students often use pictures and written content on SNSs to present themselves as ‘drinkers’ (Atkinson, Ross, Begley, & Sumnall, 2015; Ridout, Campbell, & Ellis, 2012). These references to alcohol, and reactions received from others, are often positive (Atkinson et al., 2015; Beullens & Schepers, 2013). SNS users can present their identities implicitly through SNS features such as wall posts and pictures (Fox & Vendemia, 2016; Valkenburg, Schouten, & Peter, 2005; Zhao, Grasmuck, & Martin, 2008), however, it is unclear whether SNS content accurately portrays identity, or whether it simply captures offline behaviour (Westagate & Holliday, 2016). Despite this, SNSs could offer an innovative method of identifying individuals at risk of problematic alcohol use and associated harms (Moreno, Cox, Young, & Haaland, 2015).

Ridout et al. (2012) found that over half of their participants displayed an alcohol-related profile picture on Facebook, and that a greater overall display of alcohol, conceptualised as online drinking identity, was associated with greater alcohol use

and alcohol-related problems. Comparable associations have been found between alcohol content on Facebook profiles and greater alcohol use, through viewing SNS profiles (Moreno, Arseniev-Koehler, Litt, & Christakis, 2016; Moreno, Christakis, Egan, Brockman, & Becker, 2012; Rodriguez, Litt, Neighbors, & Lewis, 2016), and through self-report measures (Glassman, 2012; Marczinski et al., 2016; Miller, Prichard, Hutchinson, & Wilson, 2014; Westgate, Neighbors, Heppner, Jahn, & Lindgren, 2014). Moreno et al. (2015) found that displaying alcohol content in a Facebook profile picture or cover picture was a key predictor of increased binge drinking.

Study Aims

This study aims to offer an original research contribution by exploring the relationship between drinking identity and alcohol use in a community sample. This study will primarily focus on explicit drinking identity (self-report), but additionally consider the novel approach of exploring alcohol content in participant's SNS pictures, via self-report and by obtaining a copy of participant's SNS profile pictures. Explicit drinking identity will also be explored as a moderator of the relationship between mental health symptoms and alcohol use, offering a novel research contribution. These relationships will be explored in females aged 18 to 24 years old because of the gender differences and gender-specific implications associated with alcohol use in females, and the high prevalence of heavy alcohol use in this age group.

The primary aim of this study is to explore the association between explicit drinking identity and alcohol use in a community sample of young females.

The secondary aims of this study are:

- To explore the relationship between mental health symptoms and alcohol use in a community sample of young females.
- To assess whether explicit drinking identity moderates the relationship between mental health symptoms and alcohol use in a community sample of young females.
- To explore the relationship between alcohol content in SNS pictures and alcohol use in a community sample of young females.

Study Hypotheses

1. There is a relationship between explicit drinking identity and alcohol use:
    a) Young females who have a greater explicit drinking identity engage in greater hazardous alcohol use.
    b) Young females who have a greater explicit drinking identity are more likely to binge drink.

2. There is a relationship between mental health symptoms and alcohol use:
    a) Young females who experience greater depressive and anxiety symptoms engage in greater hazardous alcohol use.

b) Young females who experience greater depressive and anxiety symptoms are more likely to binge drink.

3. Explicit drinking identity may moderate the relationship between mental health symptoms and alcohol use:

a) Explicit drinking identity may moderate the relationship between depressive symptoms and hazardous alcohol use.
b) Explicit drinking identity may moderate the relationship between anxiety symptoms and hazardous alcohol use.

4. There is a relationship between alcohol content in SNS pictures and alcohol use:

a) Young females who self-report having alcohol content in pictures on their SNS profiles engage in greater hazardous alcohol use.
b) Young females who self-report having alcohol content in pictures on their SNS profiles are more likely to binge drink.
c) Young females who have alcohol content in their SNS profile picture engage in greater hazardous alcohol use.
d) Young females who have alcohol content in their SNS profile picture are more likely to binge drink.

Methodology

Design

A correlational design was used. The bivariate relationships between explicit drinking identity, alcohol use, mental health, and alcohol content in SNS pictures were investigated. In addition, a moderation analysis was conducted where the Dependant Variable (DV) was hazardous alcohol use, the Independent Variable (IV) was mental health symptoms, and explicit drinking identity was investigated as a Moderation Variable (MV).

Participants

398 female participants with ages ranging from 18 to 24 years old (M = 20.08, SD = 2.11) took part in the study. Participant inclusion and exclusion criteria are presented in Table 14. Participants had to live in the UK to minimise effects of cultural differences, be a SNS user because this was a secondary focus of the study, and be able to read and respond to questions in English because the online survey was available in English only. The current study sought to explore drinking identity amongst young females who currently drink alcohol and whether this was influenced by their varying degrees of current alcohol use. Hence, those who did not currently drink alcohol were excluded in an attempt to reduce bias in the data and analysis.

Table 14. *Participant Inclusion and Exclusion Criteria*

Inclusion criteria	Exclusion criteria
Female	Male
Aged 18 to 24 years old	Under 18 years old
	25 years old and above
Consumes alcohol (to any degree)	Does not currently consume any alcohol
Living in the UK	Living outside the UK
A user of any social networking site	Not a current social networking site user
Able to read and respond to questions in English	Unable to read and respond to questions in English

Participants were recruited on the SNS Facebook. A SNS is a website where users create a public or semi-public profile and interact with others (Boyd & Ellison, 2008). Facebook, Twitter, and Instagram are popular SNSs in the UK and are used worldwide (Department for Culture, Media, and Sport, 2016; Ofcom, 2016). In 2016, Facebook reported having 1.13 billion users (Facebook Newsroom, 2016), Twitter reported having 313 million users (Twitter, 2016), and Instagram reported having 300 million users (Facebook Newsroom, 2016).

A Facebook status update was created containing the study invitation, with a link to an online survey. This invitation was shared with the author's SNS friends (N = 96) and they were asked to share the post with their friends, utilising a snowball sampling methodology (Goodman, 1961). In addition, opportunity sampling was utilised. The study invitation was posted on 50 Facebook groups selected through the 'discover' tab in the 'groups' section on Facebook, which recommends groups to join. This non-random method of selection may have introduced sampling bias, however, groups were selected based on different

locations and topics in order to minimise the risk of this and obtain a diverse sample. The advertisement was posted 211 times across 50 groups between July and October 2016 (see Appendix A).

A shortened link to the online survey was created through the website 'Bitly', which also tracked interest in the link. The recruitment process is visually presented in Figure 2. The link was clicked 1399 times, 88% (1228/1399) from the UK, 12% (171/1399) outside the UK did not meet inclusion criteria. 70% (571/819) of individuals who started the survey provided full consent, 28% (233/819) discontinued before consenting, and 2% (15/819) did not provide full consent. 70% (398/571) of those who provided full consent completed the survey in full, 20% (114/571) did not complete the survey in full, 6% (33/571) left the survey blank, and 5% (26/571) were identified as non-drinkers from their survey responses and therefore did not meet inclusion criteria. This resulted in a sample of 398 participants, of which 36% (142/398) provided a copy of their SNS profile picture by uploading it to the online survey.

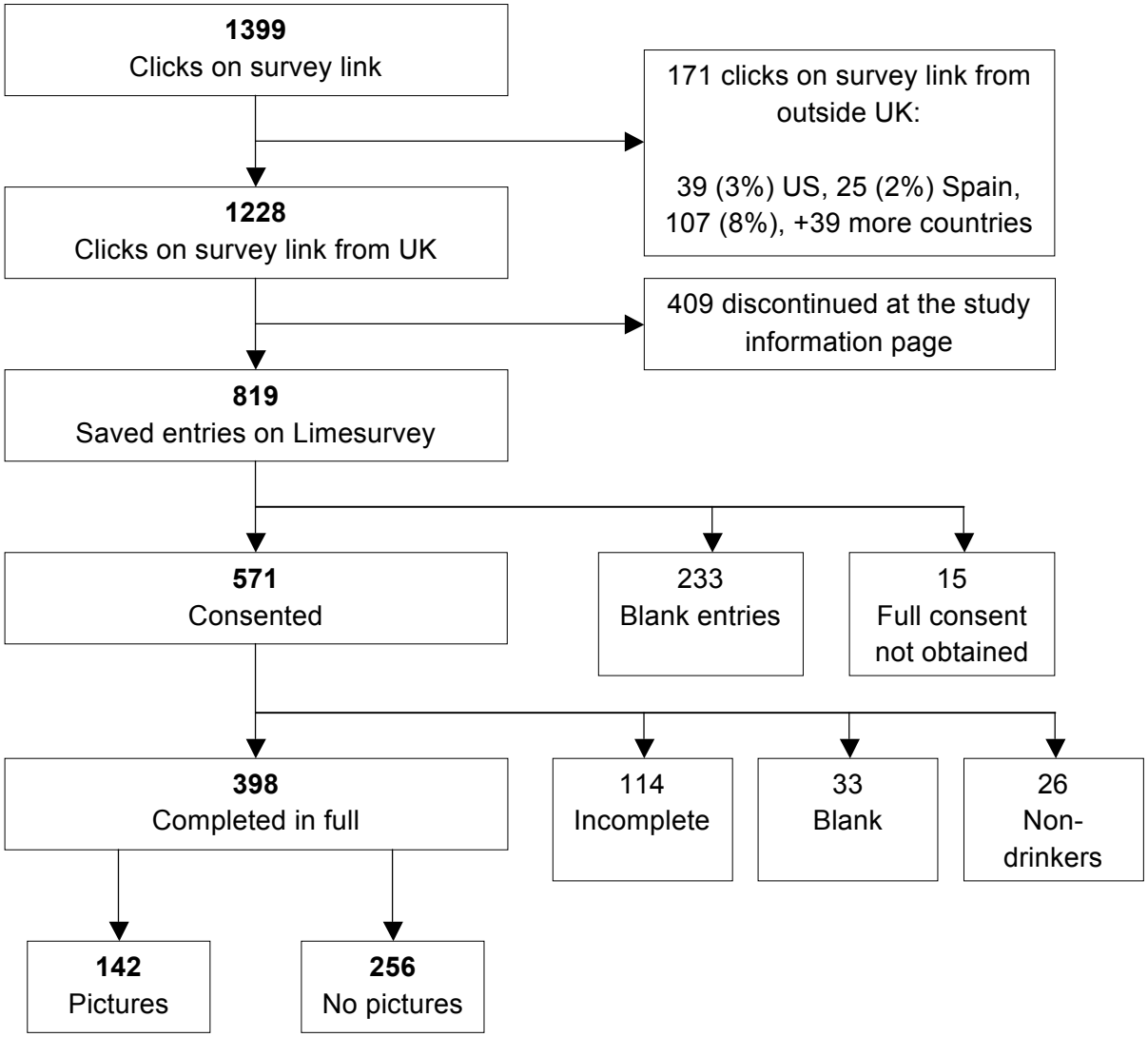

Figure 2. *Flowchart Displaying the Recruitment Process*

Materials

Participants completed an online survey. They were firstly presented with the study information sheet (see Appendix B) and consent form (see Appendix C). Participants were required to consent to take part by selecting 'I agree'. Each section of the online survey is described below and available in full in Appendix D.

Demographic questions. Participants were asked forced choice questions about their age, ethnicity, country/region of residence, education, religion, occupation, relationship status, living status, and whether they had children. All questions had the option to respond 'other' and provide an explanation.

Alcohol-related questions.

Binge drinking questions. This study used the UK definition of binge drinking because participants were from the UK. Participants were asked *"in the past two weeks have there been any occasions where you have drank six or more units of alcohol in one sitting?"* with a yes/no response option. Participants were also asked the age they first consumed alcohol and first engaged in binge drinking.

Alcohol Use Disorders Identification Test (AUDIT) (Saunders, Aasland, Babor, de la Fuente, & Grant, 1993). Hazardous alcohol use was assessed using the AUDIT, a widely recognised 10-item measure developed by the World Health Organisation. Participants were asked questions such as *"how often do you have a drink containing alcohol?"*. Responses were scored from 0 to 4 with a maximum score of 40. Scores of 0 to 7 indicated low risk of alcohol-related problems, 8 to 15 indicated increasing risk of alcohol-related problems, 16 to 19 indicated high risk of alcohol-related problems, and 20 and above indicated possible alcohol dependence. The AUDIT has acceptable internal consistency in a general

population (α = 0.75) (Rumpf, Hapke, Meyer, & John, 2002), and high test-retest reliability (Selin, 2003).

Alcohol Self-Concept Scale (ASC) (Lindgren et al., 2013). Explicit drinking identity was assessed using the ASC, a five-item measure adapted from the Smoker Self-Concept Scale (Shadel & Mermelstein, 1996), and frequently used in research (Foster, 2014; Foster, Yeung, & Quist, 2014; Foster, Young, & Barnighausen, 2014; Lindgren et al., 2013). Participants were asked how much they agreed or disagreed with statements such as *"drinking is a part of who I am"*. Responses were scored from -3 (strongly disagree) to 3 (strongly agree) with a maximum score of 15. Cut-off scores have not been derived, but higher mean scores indicate a stronger belief that drinking is part of the self. The ASC has excellent internal consistency (α = 0.92) (Lindgren et al., 2013).

Mental health questions.

Patient Health Questionnaire-9 (PHQ-9) (Kroenke, Spitzer, & Williams, 2001). Depressive symptoms were assessed using the PHQ-9, a widely recognised nine-item measure. Participants were asked how often they were bothered by symptoms such as *"having little interest or pleasure in doing things"* over the last two weeks. Responses were scored from 0 to 3 with a maximum score of 27. Scores of 0 to 4 indicated no/minimal symptoms, 5 to 9 indicated mild symptoms, 10 to 14 indicated moderate symptoms, 15 to 19 indicated moderate/severe symptoms, and 20 to 27 indicated severe symptoms of

depression. The PHQ-9 has good internal consistency (α = 0.86-0.89) and high test-retest reliability (Kroenke at al., 2001).

Generalised Anxiety Disorder-7 Questionnaire (GAD-7) (Spitzer, Kroenke, Williams, & Löwe, 2006). Anxiety symptoms were assessed using the GAD-7, a widely recognised seven-item measure. Participants were asked how often they were bothered by symptoms such as *"feeling nervous, anxious, or on edge"* over the last two weeks. Responses were scored from 0 to 3 with a maximum score of 21. Scores of 0 to 4 indicated no/minimal symptoms, 5 to 9 indicated mild symptoms, 10 to 14 indicated moderate symptoms, and scores of 15 to 21 indicated severe symptoms of anxiety. The GAD-7 has excellent internal consistency (α = 0.92) and good test-retest reliability (Spitzer et al., 2006).

Social networking site questions. Participants were asked questions about their SNS use, including which SNS they used most frequently. Participants were asked *"with regards to your most frequently used SNS, are there any pictures of you on this site with alcohol in them?"* with a yes/no response option. Glassman (2012) used this method and reported satisfactory reliability (α = 0.72). This self-report question may be subject to bias and therefore a more objective measure of picture content was considered. Participants were asked to provide a copy of their profile picture of their most frequently used SNS, by uploading it to the online survey. This method was chosen because it was decided that accessing participants SNS profiles, often the methodology of choice in this research area, raised too many ethical and data protection issues to resolve within the time

constraints of the research. The profile picture was chosen due to research finding greater associations between alcohol use and profile picture content compared to other pictures and textual content (Miller et al., 2014; Moreno et al., 2015). In addition, a profile picture is actively selected by the profile owner to display as their main picture to be seen by other users.

Debriefing. The online survey concluded with debriefing information about the study. Contact details were also provided for mental health and alcohol support services (see Appendix E).

Procedure

Ethical approval was received through the University of Birmingham (see Appendix F). An online survey was created using Limesurvey, a survey development website. Potential participants were provided with a link to the survey via Facebook. The survey presented participants with information about the study, including their ethical rights, and asked participants to provide consent before answering the questions and uploading their profile picture. Finally, participants were presented with debriefing information and contact details for mental health and alcohol support services. Participants were able to leave questions blank that they did not wish to answer.

Scores for each participant on each measure were calculated ready for analysis. Profile pictures were categorised into ‘alcohol content’ or ‘no alcohol content’,

using the procedure described by Dollinger et al. (1993) and Ridout et al. (2012). Pictures showing alcohol use (e.g. holding an alcoholic drink or a mixed drink on a table), displays of alcohol (e.g. in a drinks cabinet), or alcohol brands (e.g. on clothes or posters) were categorised as containing 'alcohol content'. A sample set of 16 pictures was developed and categorised by 16 Trainee Clinical Psychologists, in order to identify potential difficulties or discrepancies with categorisation. An example of a discrepancy in the sample set included pictures where an individual appeared under the influence of alcohol (e.g. lying on the floor) but no alcohol content was present. It was decided that pictures such as these would be categorised as 'no alcohol content' as they did not meet criteria described by Dollinger et al. (1993) and Ridout et al. (2012). 142 profile pictures were categorised by the author and a subsample of 30 pictures (21%) were categorised by a second-rater with 100% consensus.

The majority of statistical analysis was conducted using SPSS version 24. RStudio (RStudio Team, 2015) was used to derive bootstrap estimates for moderation analysis due to non-parametric data.

Results

Demographic and Clinical Characteristics

398 participants took part in the study. Participant's demographic characteristics are presented in Table 15. All participants were female and aged 18 to 24 years old (M = 20.08, SD = 2.11). The majority of participants were White British (91.46%), living in England (62.56%), identified as having no religion (66.83%), had a highest qualification of an A-level or equivalent (66.83%), were not in a relationship (62.10%), lived with parents (40.20%), and had no children (95.23%). Two thirds of participants were students (60.55%). Further information on student status was not collected (e.g. college or university, undergraduate or postgraduate).

Table 15. *Participant Demographic Characteristics*

		All participants (*N* = 398)
Age (*M*, *SD*)		20.08 (2.11)
Ethnicity (*N*, %)	White/White British	364 (91.46%)
	Asian/Asian British	11 (2.76%)
	Black/Black British	3 (0.75%)
	Mixed ethnicity	17 (4.27%)
	Other ethnic group	3 (0.75%)
Country of residence (*N*, %)	England	249 (62.56%)
	Scotland	120 (30.15%)
	Wales	21 (5.28%)
	Northern Ireland	6 (1.51%)
	Missing data	2 (0.50%)
Religion (*N*, %)	No religion	266 (66.83%)
	Christian	119 (29.90%)
	Muslim	3 (0.75%)
	Other	8 (2.01%)
	Missing data	2 (0.50%)
Highest qualification (*N*, %)	No qualifications	2 (0.50%)
	GCSE / NVQ level 1/2	17 (4.27%)
	A-level or equivalent	266 (66.83%)
	Degree	91 (22.86%)
	Masters Degree	19 (4.77%)
	PHD/Doctorate	2 (0.50%)
	Missing data	1 (0.25%)
Employment status (*N*, %)	Student	190 (47.74%)
	Working	137 (34.42%)
	Student and working	51 (12.81%)
	Unemployed	15 (3.77%)
	Missing data	5 (1.26%)
Relationship status (*N*, %)	Single	247 (62.10%)
	In a relationship not cohabiting	88 (22.11%)
	In a relationship and cohabiting	56 (14.07%)
	Married	1 (0.25%)
	Missing data	6 (1.51%)
Living status (*N*, %)	Parents / family	160 (40.20%)
	Alone	93 (23.37%)
	Friends / student accommodation	86 (21.61%)
	Partner	55 (13.82%)
	Missing data	4 (1.01%)
Children (*N*, %)	No children	379 (95.23%)
	Children	12 (3.02%)
	Missing data	7 (1.76%)

Descriptive statistics for each alcohol-related measure, along with the number of participants falling within cut-off categories where applicable, are presented in Table 16. On average, participants first consumed alcohol at 13.85 years old and first engaged in binge drinking at 16.15 years old. Participants were categorised as binge drinkers (BD) or non-binge drinkers (NBD) based on whether they had engaged in binge drinking in the past two weeks. The majority of participants were categorised as binge drinkers (60.55%). The mean AUDIT score was 10.58, above the cut-off score of 8 for hazardous drinking, with the majority of participants falling within the 'at risk of alcohol-related problems' category (40.70%). The mean ASC score was -8.77. There are currently no cut-off scores for the ASC but minus scores suggest participants are 'disagreeing' that alcohol is part of their identity.

Table 16. *Alcohol Use and Drinking Identity of Participants*

		All participants (*N* = 398)
Alcohol use		
Age first consumed alcohol (*M*, *SD*)		13.85 (2.71)
Age first engaged in binge drinking (*M*, *SD*)		16.15 (1.78)
Never engaged in binge drinking (*N*, %)		38 (9.55%)
Missing data (*N*, %)		6 (1.51%)
Current binge drinking status	BD (*N*, %)	241 (60.55%)
	NBD (*N*, %)	157 (39.45%)
AUDIT (hazardous alcohol use) score (*M*, *SD*)		10.58 (7)
AUDIT categories (*N*, %)	Low risk of alcohol-related problems	148 (37.19%)
	At risk of alcohol-related problems	162 (40.70%)
	High risk of alcohol-related problems	42 (10.55%)
	Possible alcohol dependence	46 (11.56%)
Drinking identity		
ASC (drinking identity) score (*M*, *SD*)		-8.77 (7.51)

Descriptive statistics for mental health-related measures are presented in Table 17. The majority of participants experienced symptoms of depression (62.56%) and anxiety (53.02%), ranging from mild to severe.

Table 17. *Mental Health Characteristics of Participants*

		All participants (*N* = 398)
PHQ-9 (depression) score (*M*, *SD*)		8.29 (6.69)
PHQ-9 categories (*N*, %)	No symptoms	149 (37.44%)
	Mild symptoms	106 (26.63%)
	Moderate symptoms	72 (18.09%)
	Moderate/severe symptoms	37 (9.30%)
	Severe symptoms	34 (8.54%)
GAD-7 (anxiety) score (*M*, *SD*)		6.36 (5.72)
GAD-7 categories (*N*, %)	No symptoms	187 (46.98%)
	Mild symptoms	102 (25.63%)
	Moderate/severe symptoms	67 (16.83%)
	Severe symptoms	42 (10.55%)

Demographic characteristics of binge drinkers and non-binge drinkers are presented in Table 18. A statistical comparison of groups was not conducted because this was not a primary focus of the study.

Table 18. *Demographic Characteristics of Binge Drinkers and Non-Binge Drinkers*

		BD (*N* = 241)	NBD (*N* = 157)
Age (*M*, *SD*)		19.85 (2.053)	20.45 (2.148)
Ethnicity (*N*, %)	White/White British	220 (91.29%)	144 (91.72%)
	Asian/Asian British	7 (2.90%)	4 (2.53%)
	Black/Black British	2 (0.83%)	1 (0.64%)
	Mixed ethnicity	10 (4.15%)	7 (4.46%)
	Other ethnic group	2 (0.83%)	1 (0.64%)
Country of residence (*N*, %)	England	148 (61.41%)	101 (64.33%)
	Scotland	75 (31.12%)	45 (28.66%)
	Wales	11 (4.56%)	10 (6.37%)
	Northern Ireland	5 (2.07%)	1 (0.64%)
	Missing data	2 (0.83%)	0
Religion (*N*, %)	No religion	157 (65.15%)	109 (69.43%)
	Christian	75 (31.13%)	44 (28.03%)
	Muslim	2 (0.83%)	1 (0.64%)
	Other	5 (2.07%)	3 (1.91%)
	Missing data	2 (0.83%)	0
Highest qualification (*N*, %)	No qualifications	1 (0.41%)	1 (0.64%)
	GCSE / NVQ level 1/2	13 (5.39%)	4 (2.53%)
	A-level or equivalent	168 (69.71%)	98 (62.42%)
	Degree	51 (21.16%)	40 (25.48%)
	Masters Degree	7 (2.90%)	12 (7.64%)
	PHD / Doctorate	1 (0.41%)	1 (0.64%)
	Missing data	0	1 (0.64%)
Employment status (*N*, %)	Student	115 (47.72%)	75 (47.77%)
	Working	85 (35.27%)	52 (33.12%)
	Student and working	31 (12.86%)	20 (12.74%)
	Unemployed	8 (3.32%)	7 (4.46%)
	Missing data	2 (0.83%)	3 (1.91%)
Relationship status (*N*, %)	Single	153 (63.49%)	94 (59.87%)
	In a relationship not cohabiting	55 (22.82%)	33 (21.02%)
	In a relationship and cohabiting	28 (11.62%)	28 (17.83%)
	Married	1 (0.41%)	0
	Missing data	4 (1.66%)	2 (1.27%)
Living status (*N*, %)	Parents / family	107 (44.40%)	53 (33.76%)
	Alone	58 (24.07%)	35 (22.29%)
	Friends / student accommodation	48 (19.92%)	38 (24.20%)
	Partner	26 (10.79%)	29 (18.47%)
	Missing data	2 (0.83%)	2 (1.27%)
Children (*N*, %)	No children	233 (96.68%)	146 (92.99%)
	Children	4 (1.66%)	8 (5.10%)
	Missing data	4 (1.66%)	3 (1.91%)

Data Analysis

Data was inspected to ensure no violation of parametric assumptions. To inspect normality, the shape of distribution (see Appendix G) and values of Skewness and Kurtosis were inspected. Distributions appeared visually skewed and values were greater than twice the standard error (Coolican, 2004) for scores on the AUDIT, ASC, PHQ-9, and GAD-7, therefore violating the assumption of normality. Non-parametric analyses were therefore conducted.

Hypothesis 1: Explicit Drinking Identity and Alcohol Use

A Spearman rank-order correlation coefficient was computed to assess the relationship between ASC scores and AUDIT scores. There was a large significant positive correlation between the variables, r_s *(*398) = 0.58, $p < 0.001$, suggesting that young females who have a greater explicit drinking identity engage in greater hazardous alcohol use, therefore confirming hypothesis 1a.

A Spearman rank-order correlation coefficient was computed to assess the relationship between ASC scores and binge drinking status. There was a medium significant positive correlation between the variables, r_s *(*398) = 0.46, $p < 0.001$, suggesting that young females who have a greater explicit drinking identity are more likely to binge drink, therefore confirming hypothesis 1b.

Hypothesis 2: Mental Health Symptoms and Alcohol Use

A Spearman rank-order correlation coefficient was computed to assess the relationship between PHQ-9 scores and AUDIT scores. There was a small significant positive correlation between the variables, r_s *(*398) = 0.21, $p < 0.001$, suggesting that young females who experience greater depressive symptoms engage in greater hazardous alcohol use, therefore confirming hypothesis 2a.

A Spearman rank-order correlation coefficient was computed to assess the relationship between GAD-7 scores and AUDIT scores. There was a small significant positive correlation between the variables, r_s *(*398) = 0.13, $p = 0.01$, suggesting that young females who experience greater anxiety symptoms engage in greater hazardous alcohol use, therefore confirming hypothesis 2a.

A Spearman rank-order correlation coefficient was computed to assess the relationship between PHQ-9 scores and binge drinking status. There was a non-significant correlation between the variables, r_s *(*398) = 0.05, $p = 0.33$, suggesting that young females who experience greater depressive symptoms are not statistically more likely to binge drink, therefore rejecting hypothesis 2b.

A Spearman rank-order correlation coefficient was computed to assess the relationship between GAD-7 scores and binge drinking status. There was a non-significant correlation between the variables, r_s *(*398) = -0.04, $p = 0.44$,

suggesting that young females who experience greater anxiety symptoms are not statistically more likely to binge drink, therefore rejecting hypothesis 2b.

Hypothesis 3: Explicit Drinking Identity, Mental Health Symptoms, and Hazardous Alcohol Use

The multivariate relationship between explicit drinking identity, mental health symptoms, and hazardous alcohol use were explored using a moderator analysis (Hayes, 2013) implemented in the PROCESS custom procedures for SPSS. Hazardous alcohol use was the DV, mental health symptoms were the IV, and explicit drinking identity was investigated as a MV (see Figure 3).

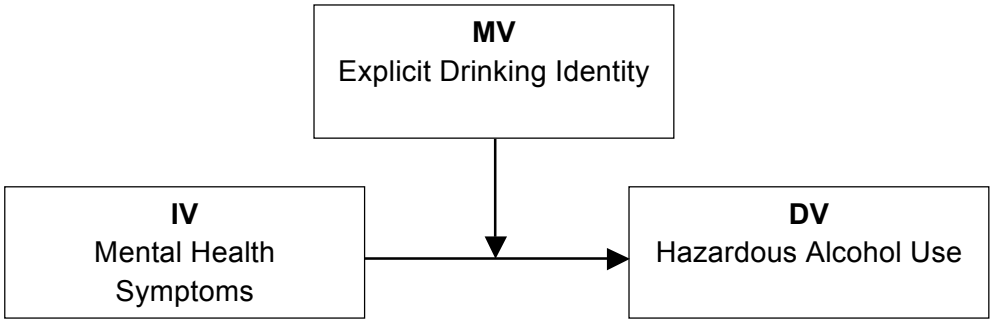

Figure 3. *Moderation Analysis to Be Tested*

The statistical model being tested involved testing the relationships between mental health symptoms and hazardous alcohol use, explicit drinking identity and hazardous alcohol use, and the effect of the interaction between mental health symptoms and explicit drinking identity on hazardous alcohol use (see Figure 4).

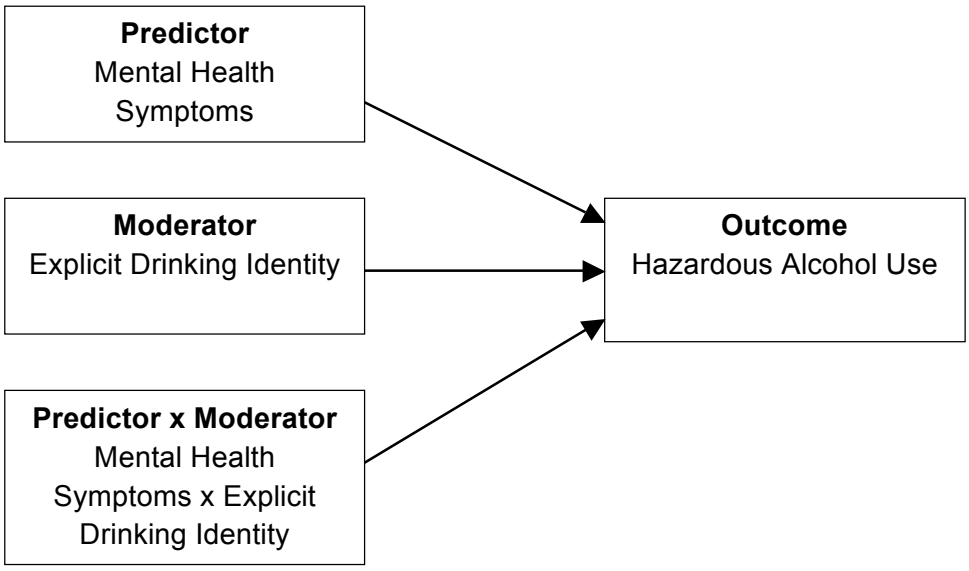

Figure 4. *Statistical Model Being Tested for the Moderation Analysis*

Moderation analysis for depressive symptoms. A moderation analysis was conducted to test the interaction effect of ASC scores on the relationship between PHQ-9 scores and AUDIT scores. Implemented in the PROCESS custom procedures for SPSS, the interaction effect was significant, b = 0.02, 95% CI (0.01, 0.03), t = 3.67, p < 0.001. As data was non-parametric, a bias corrected and accelerated bootstrap analysis was conducted in RStudio, which did not depend on parametric assumptions and was therefore robust to violations of normality. The analysis provided a bootstrap estimate for the regression coefficient and confidence intervals. The interaction effect was significant, b = 0.02, 95% CI (0.00, 0.03), suggesting that the relationship between depressive symptoms and hazardous alcohol use is moderated by explicit drinking identity, therefore supporting hypothesis 3a.

To explore the nature of moderation further a simple slopes analysis (Aiken & West, 1991; Rogosa, 1981) was conducted which compares the relationship

between the predictor and the outcome at varying levels of the moderator. When explicit drinking identity was low, there was a non-significant relationship between depressive symptoms and hazardous alcohol use, b = 0.03, 95% CI (-0.08, 0.14), t = 0.55, p = 0.59. At the mean value of explicit drinking identity, there was a significant positive relationship between depressive symptoms and hazardous alcohol use, b = 0.14, 95% CI (0.05, 0.23), t = 3.21, p < 0.001. When explicit drinking identity was high, there was a significant positive relationship between depressive symptoms and hazardous alcohol use, b = 0.27, 95% CI (0.17, 0.38), t = 5.27, p < 0.001. The simple slopes analysis suggested that depressive symptoms only predicted hazardous alcohol use at mean and high levels of explicit drinking identity. A visual representation of the simple slopes analysis is presented in Figure 5.

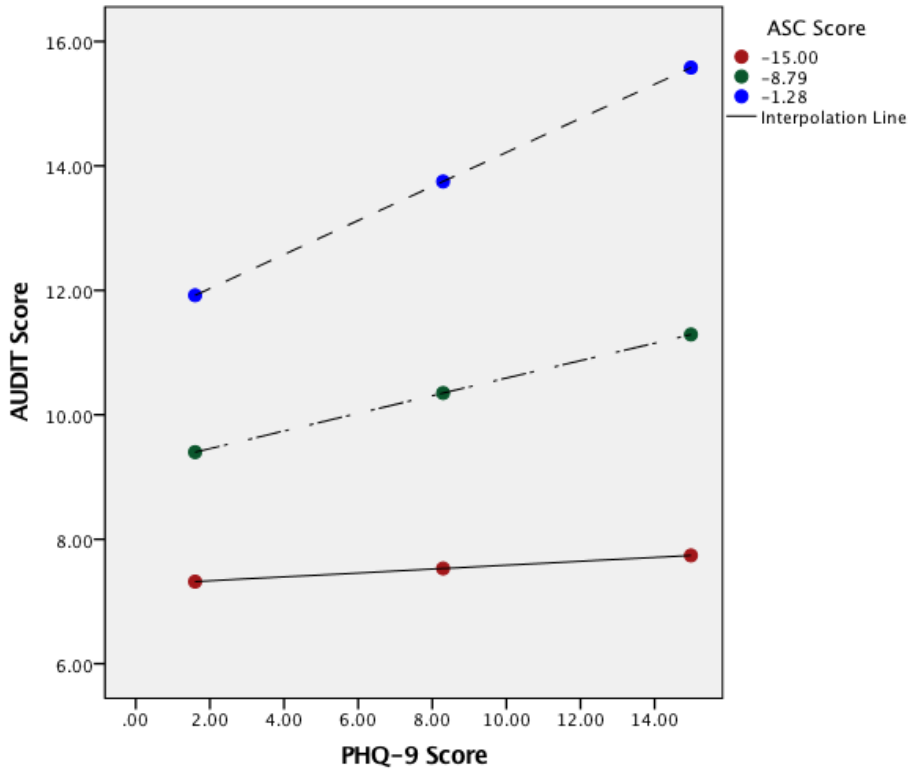

Figure 5. *Simple Slopes Analysis Exploring the Relationship between AUDIT and PHQ-9 Scores at Low, Medium, and High Levels of the Moderator*

Further exploration of the nature of moderation was conducted using the Johnson-Neyman method (1936), which explores the relationship between the predictor and the outcome at multiple values of the moderator and identifies specific values of the moderator for which the predictor significantly predicts the outcome. For the relationship between depressive symptoms and severity of alcohol use, the significance region began at a score of -11.44 on the ASC, b = 0.09, 95% CI (0.00, 0.19), t = 1.97, p = 0.05. Significance levels increased with scores and became highly significant (p < 0.001) from scores of -9.00 and above on the ASC. This suggested that depressive symptoms predicted hazardous alcohol use from scores of -11.44 and above on the ASC.

Moderation analysis for anxiety symptoms. A moderation analysis was conducted to test the interaction effect of ASC scores on the relationship between GAD-7 scores and AUDIT scores. Implemented in the PROCESS custom procedures for SPSS, the interaction effect was significant, b = 0.01, 95% CI (0.00, 0.03), t = 2.26, p = 0.02. As data was non-parametric, a bias corrected and accelerated bootstrap analysis was conducted in RStudio. The analysis provided a bootstrap estimate for the regression coefficient and confidence intervals. The interaction effect was non-significant, b = 0.01, 95% CI (-0.01, 0.03). The opposing significance levels suggested that the SPSS results were biased by the non-parametric nature of the data and therefore conclusions were drawn from the bootstrap analysis only, suggesting that the relationship between anxiety symptoms and hazardous alcohol use is not moderated by explicit drinking identity, therefore rejecting hypothesis 3b. Despite the non-significant results, the confidence intervals suggested a trend towards significance.

Social Networking Site Data

The majority of participants used Facebook most frequently (72.36%), accessed SNSs several times a day (96.48%), and had between 101 and 500 SNS friends (48.74%). The majority of participants reported having pictures containing alcohol on their SNS profiles (73.12%). Participant's responses to SNS questions are presented in Table 19.

Table 19. *Participant Responses to Social Networking Site Questions*

		All participants (*N* = 398)
Most frequently used SNS (*N*, %)	Facebook	288 (72.36%)
	Instagram	48 (12.06%)
	Snapchat	3 (0.75%)
	Tumblr	8 (2.01%)
	Twitter	47 (11.81%)
	Missing	4 (1.01%)
Frequency of SNS use (*N*, %)	Several times a week	1 (0.25%)
	Once a day	9 (2.26%)
	Several times a day	384 (96.48%)
	Missing	4 (1.01%)
Number of SNS friends (*N*, %)	0	1 (0.25%)
	1-100	38 (9.55%)
	101-500	194 (48.74%)
	501-1000	116 (29.15%)
	1001-2000	35 (8.79%)
	2001-3000	2 (0.50%)
	4000	2 (0.50%)
	5000	2 (0.50%)
	Missing	8 (2.01%)
Self-report alcohol content in SNS pictures (*N*, %)	Yes	291 (73.12%)
	No	107 (26.88%)

35.68% (142/398) of participants uploaded their SNS profile picture. A visual comparison of demographic characteristics between ‘picture’ and ‘no picture’ participants is provided in Table 20.

Table 20. *Demographic Characteristics between Participants Who Did and Did Not Upload Their Social Networking Site Profile Picture*

		Picture (*N* = 142)	No picture (*N* = 256)
Age (*M*, *SD*)		20.06 (2.11)	20.09 (2.11)
Ethnicity (*N*, %)	White/White British	128 (90.14%)	236 (92.19%)
	Asian/Asian British	7 (4.93%)	4 (1.56%)
	Black/Black British	1 (0.70%)	2 (0.78%)
	Mixed ethnicity	6 (4.23%)	11 (4.30%)
	Other ethnic group	0	3 (1.17%)
Country of residence (*N*, %)	England	86 (60.56%)	163 (63.67%)
	Scotland	45 (31.69%)	75 (29.30%)
	Wales	10 (7.04%)	11 (4.30%)
	Northern Ireland	1 (0.70%)	5 (1.95%)
	Missing data	0	2 (0.78%)
Religion (*N*, %)	No religion	98 (69.01%)	168 (65.63%)
	Christian	36 (25.25%)	83 (32.42%)
	Muslim	1 (0.70%)	2 (0.78%)
	Other	6 (4.23%)	2 (0.78%)
	Missing data	1 (0.70%)	1 (0.39%)
Highest qualification (*N*, %)	No qualifications	1 (0.70%)	1 (0.39%)
	GCSE / NVQ level 1/2	1 (0.70%)	16 (6.25%)
	A-level or equivalent	93 (65.49%)	173 (67.58%)
	Degree	37 (26.06%)	54 (21.09%)
	Masters Degree	9 (6.34%)	10 (3.91%)
	PHD / Doctorate	0	2 (0.78%)
	Missing data	1 (0.70%)	0
Employment status (*N*, %)	Student	71 (50%)	119 (46.48%)
	Working	43 (30.28%)	94 (36.72%)
	Student and working	20 (14.08%)	31 (12.11%)
	Unemployed	6 (4.23%)	9 (3.52%)
	Missing data	2 (1.41%)	3 (1.17%)
Relationship status (*N*, %)	Single	88 (61.97%)	159 (62.11%)
	In a relationship not cohabiting	35 (24.65%)	53 (20.70%)
	In a relationship and cohabiting	17 (11.97%)	39 (15.23%)
	Married	0	1 (0.39%)
	Missing data	2 (1.41%)	4 (1.56%)
Living status (*N*, %)	Parents / family	53 (37.32%)	107 (41.80%)
	Alone	39 (27.46%)	54 (21.10%)
	Friends / student accommodation	32 (22.54%)	54 (21.10%)
	Partner	16 (11.27%)	39 (15.23%)
	Missing data	2 (1.41%)	2 (0.78%)
Children (*N*, %)	No children	137 (96.48%)	242 (94.53%)
	Children	2 (1.41%)	10 (3.91%)
	Missing data	3 (2.11%)	4 (1.56%)

Scores on measures for 'picture' and 'no picture' participants were compared statistically in order to identify any potential bias in the picture sample. A two-sided test of equality for column means was computed for each measure. Results were significant for scores on the AUDIT (p = 0.035), PHQ-9 (p = 0.002), and GAD-7 (p = 0.008), suggesting that participants who uploaded their SNS profile picture were less likely to engage in hazardous alcohol use and more likely to experience greater symptoms of depression and anxiety. Participants did not significantly differ in ASC scores, suggesting there was no difference in explicit drinking identity between participants who did and did not upload their profile picture. 64.84% (166/256) of 'no picture' participants were categorised as binge drinkers, and 52.82% (75/142) of 'picture' participants were categorised as binge drinkers. A chi-square test of independence was performed to examine the relation between binge drinking status and uploading a SNS profile picture. The relation between these variables was significant, X^2 = 5.53; df = 1; p = 0.019, suggesting that young females who uploaded their profile picture were less likely to binge drink.

Hypothesis 4: Alcohol Content in Social Networking Site Pictures and Alcohol Use

Self-reported alcohol content in social networking site pictures. Analysis for self-reported alcohol content in SNS pictures was conducted with data from all participants (N = 398).

A Spearman rank-order correlation coefficient was computed to assess the relationship between self-reported presence of alcohol content in SNS pictures and AUDIT scores. There was a small significant positive correlation between the variables, r_s *(*398) = 0.24, p < 0.001, suggesting that young females who self-report having alcohol content in pictures on their SNS profiles engage in greater hazardous alcohol use, therefore supporting hypothesis 4a.

A Phi coefficient, a measure of correlation between two truly dichotomous variables (Coolican, 2004), was computed to assess the relationship between self-reported presence of alcohol content in SNS pictures and binge drinking status. A weak significant result was found, Φ = 0.18, p < 0.001, suggesting that young females who self-report having alcohol content in pictures on their SNS profiles are more likely to binge drink, therefore supporting hypothesis 4b.

Alcohol content in uploaded social networking site profile pictures. Analysis for alcohol content in uploaded SNS profile pictures was conducted on the sample of participants who uploaded their picture (N = 142). 10.56% (15/142) of participants displayed alcohol content in their profile pictures, limitations of conducting analysis with this small sample are discussed later in this report.

A Spearman rank-order correlation coefficient was computed to assess the relationship between alcohol content in SNS profile pictures and AUDIT scores. There was a small significant positive correlation between the variables, r_s *(*142) = 0.23, p = 0.006, suggesting that young females who have alcohol

content in their SNS profile picture engage in greater hazardous alcohol use, supporting hypothesis 4c.

A Phi coefficient was computed to assess the relationship between the presence of alcohol content in SNS profile pictures and binge drinking status. A non-significant result was found, $\Phi = 0.1$, $p = 0.256$, suggesting that young females who have alcohol content in their SNS profile picture are not statistically more likely to binge drink, therefore rejecting hypothesis 4d.

Discussion

Overview of Findings

The findings of this study supported several of the hypotheses suggesting that: young females with a greater explicit drinking identity engage in greater hazardous alcohol use and are more likely to binge drink; young females with greater depressive and anxiety symptoms engage in greater hazardous alcohol use; and the relationship between depressive symptoms and hazardous alcohol use in young females is stronger when drinking identity is greater. Hypotheses concerning alcohol content in SNS pictures were also supported suggesting that: young females who self-report having alcohol content in pictures on their SNS profiles engage in greater hazardous alcohol use and are more likely to binge drink; and young females who have alcohol content in their SNS profile pictures engage in greater hazardous alcohol use, however, the sample size reduced the reliability of this finding. Conversely, a number of hypotheses were not supported suggesting that: young females with greater depressive and anxiety symptoms are not statistically more likely to binge drink; the relationship between anxiety symptoms and hazardous alcohol use in young females is not moderated by drinking identity; and young females who display alcohol content in their SNS profile pictures are not statistically more likely to binge drink.

Drinking Identity and Drinking Behaviours

This study offers unique findings regarding the relationship between drinking identity and alcohol use in young females. The correlation sizes suggested that knowledge of explicit drinking identity would account for 33.64% of the variance in hazardous alcohol use and 21.16% of the variance in binge drinking status, highlighting that these findings are practically important and meaningful, as well as statistically significant. These findings were consistent with past research in student samples (Foster, Neighbors, & Young, 2014; Foster, Yeung, & Quist, 2014; Gardner et al., 2012), extending findings to a community sample of young females. Although the associations found cannot infer causation, these findings may support theories that suggest that identity can predict behaviour (Charng et al., 1988; Fekadu & Kraft, 2001), and highlights that drinking identity could be an important consideration in alcohol prevention and reduction efforts.

The majority of participants were binge drinkers (60.55%) and 62.81% fell above the cut-off score for alcohol-related problems on the AUDIT, with 10.55% being at high risk and 11.56% falling within the possible alcohol dependence category. These findings are consistent with national surveys identifying high rates of heavy alcohol use in young people. Given the possible impact of heavy alcohol use on a range of physical, social, and psychological factors, this emphasises the need to focus attention on alcohol reduction and prevention efforts within the general population.

Explicit drinking identity was measured using a validated self-report measure, the ASC. Scores range from -15 (strongly disagree to all items) to 15 (strongly agree to all items). The mean ASC score in this study was -8.77, with 82.16% (327/398) of participants obtaining a minus score suggesting they 'disagreed' to a certain degree that alcohol was part of their identity. There are no cut-off scores for the ASC but past research has found that individuals do not typically self-report high levels of drinking identity, and that minus scores are still highly predicative of drinking behaviours and do not necessarily imply an absence of drinking identity (Lindgren et al., 2013). The drinking identity scores and statistically significant and meaningful correlations obtained in this sample suggest that even minus scores on the ASC may be important in identifying young females who engage in greater alcohol use.

Mental Health Symptoms and Drinking Behaviours

The relationship between mental health and alcohol use has been well established in past research (Grant et al., 2004; Kessler et al., 1997; Regier et al., 1990), however; the findings of this study only partially supported this. The significant correlations between mental health and hazardous alcohol use displayed small correlation sizes and suggested that knowledge of depressive symptoms would account for 4.41% of the variance, and knowledge of anxiety symptoms would account for 1.69% of the variance, in hazardous alcohol use. This suggested that although results were statistically significant, the practical importance of the findings were unclear. In addition, greater depressive and anxiety symptoms were

not statistically associated with binge drinking status. These findings may be due to the non-clinical sample of participants, or due to the subjective measurement of variables. Although the mental health measures utilised were well validated, they consisted of brief measures assessing symptoms over a two-week period and cannot provide a diagnosis of depression or anxiety. In addition, categorisation of binge drinking status was solely based on binge drinking in the past two weeks. Although this time-period was consistent with the mental health measures, this categorisation may have provided a limited measure of overall binge drinking status.

The high prevalence of participants experiencing at least mild symptoms of depression (62.56%) and anxiety (53.02%), along with the relationship between mental health symptoms and hazardous alcohol use, albeit a small association, highlights a public health need. It may be beneficial to consider mental health and alcohol use in health promotion strategies in the general population, particularly for young females.

Exploratory moderation analysis found that drinking identity became a significant moderator of the relationship between depressive symptoms and hazardous alcohol use from scores of -11.44 on the ASC. This suggested that the effect of depressive symptoms on hazardous alcohol use in young females was stronger when alcohol was seen as a part of the self, even to a small degree. In addition, a second exploratory moderation analysis found that drinking identity did not moderate the relationship between anxiety symptoms and hazardous alcohol use.

However, a trend towards significance emerged and further research exploring these relationships may be beneficial. These findings reinforce the importance of considering drinking identity in alcohol prevention and reduction efforts, particularly with those also experiencing depressive symptoms.

Alcohol Content in Social Networking Site Pictures

The study also focused on the novel approach of exploring alcohol content in SNS pictures. The first part of analysis involved self-report information only. The majority of young females reported having alcohol content in pictures on their SNS profiles (73.12%) and these young females engaged in greater hazardous alcohol use and were more likely to binge drink. These findings are consistent with past findings in student samples (Glassman, 2012; Marczinski et al., 2016), however, the correlation sizes were small and suggested that knowledge of alcohol content in SNS pictures would account for 5.76% of the variance in hazardous alcohol use and 3.24% of the variance in binge drinking status. This suggests that although results were statistically significant, the practical importance of findings were limited. Individuals who drink high quantities of alcohol may be more likely to socialise through alcohol use or in places where alcohol is present. It would therefore be unsurprising that pictures containing alcohol may be taken in these settings and uploaded to SNSs. These online depictions of alcohol may simply represent offline drinking behaviour, as opposed to representing how much an individual sees alcohol as part of their identity. Despite this, alcohol content in SNS pictures could identify individuals at risk of increased drinking behaviours;

however, it may only provide a weak measure.

The second part of analysis involved uploaded SNS profile pictures. Only 10.56% (15/142) of participant's profile pictures were categorised as containing alcohol content. Young females who had alcohol content in their SNS profile pictures engaged in greater hazardous alcohol use, however, the correlation was small and suggested that knowledge of alcohol content in SNS profile pictures would account for only 5.29% of the variance in hazardous alcohol use, displaying limited practical importance. In addition, young females who had alcohol content in their SNS profile pictures were not statistically more likely to binge drink. The small number of profile pictures containing alcohol content (N = 15) increases the risk of obtaining a statistically significant correlation by chance and therefore making a type 1 error. The findings from this analysis may therefore be unreliable and should be interpreted with caution.

Participants who uploaded their profile picture (142/398) were significantly less likely to engage in hazardous alcohol use or binge drink, presenting a possible bias in the sample. This bias may have influenced the limited number of pictures that contained alcohol content (15/142), which was inconsistent with past research that found over half of participants had an alcohol-related profile picture (Ridout et al., 2012). Young females who engaged in greater hazardous alcohol use and binge drinking may have felt able to be open in their responses to an anonymous survey, but may have chosen not to upload their picture due to concerns about it being identifiable. Alternatively, participants may simply have had data protection

and privacy concerns. The limited alcohol content in profile pictures may not be representative of other SNS users due to the possible sample bias, alternatively, it may represent a change in the content people are displaying online. Although speculative, this could be due to a number of factors, such as increasing concern about who might access SNS content (i.e. prospective employees).

Strengths of the Study

The sample size obtained (*N* = 398) increased the reliability of findings. This study did not rely on a student sample and the online recruitment method resulted in a diverse sample of participants across a range of locations in the UK, reducing the risk of sampling bias. Overall, the sample obtained provided the study with good external validity and increased the generalisability of findings to other young females.

The majority of variables were measured using well-validated self-report measures. In addition, the measures were selected based on their use in other alcohol research (e.g. AUDIT, ASC) and therefore offers readers the ability to compare findings across studies. In addition to subjective self-report information about SNS pictures, a more objective measure of profile picture content was sought in order to reduce the risk of measurement bias.

Limitations of the Study

The subjective measures used may have increased the risk of measurement bias. Binge drinking status was based on binge drinking in the past two weeks and may not have recognised all individuals who frequently engaged in binge drinking. Although uploaded profile pictures attempted to reduce the risk of measurement bias, the possible bias in the picture sample restricted the ability to reliably interpret the findings. In addition, only 15 pictures were categorised as containing alcohol content and statistical analysis on this data may have been unreliable.

For the moderation analysis, as the MV was alcohol-related (drinking identity), hazardous alcohol use was selected as the DV and mental health symptoms as the IV. This model proposes that mental health symptoms predict hazardous alcohol use. Although a causation theory such as this has been suggested, other theories have also been proposed suggesting a complex relationship between mental health and alcohol use (Moggi, 2005). The selection of variables for the moderation analysis may be a limitation of this study because it may simplify the relationship and may not be an accurate interpretation of the nature of relationship between mental health and alcohol use for all individuals in this sample. Findings from the moderation analyses must therefore be interpreted in light of these considerations.

Data was deemed non-parametric. A bootstrap moderation analysis was conducted in RStudio for the overall interaction effect only, and not for the simple

slopes analysis (Aiken & West, 1991; Rogosa, 1981), or the Johnson-Neyman method (1936), which were derived from SPSS. Therefore the proposed significance regions of drinking identity on the relationship between depressive symptoms and hazardous alcohol should be interpreted with caution due to violations of normality. However, the results from the bootstrap analysis were consistent with the SPSS analysis and therefore the SPSS results did not appear to be biased by the non-parametric nature of the data.

A national survey found that in May to June 2016, one in three 18 to 24 year olds in the UK were in full-time education (Office for National Statistics, 2016b). In the 2011 census, 83.9% of the UK population lived in England, 8.38% lived in Scotland, 4.85% lived in wales, and 2.87% lived in Northern Ireland. In addition, 87.07% identified as White British, and the majority of the population (59.3%) identified as Christian (Office for National Statistics, 2011). Comparing the participant sample of the current study to the demographics of the UK population suggest that the sample was not representative of a UK community sample. The participant sample was overrepresented in terms of students (60.55%), individuals living in Scotland (30.15%), individuals who identified as White British (91.46%), and individuals who identified as having no religion (66.83%).

Research Implications

The main findings in this study were the associations found between explicit drinking identity and drinking behaviours. To expand knowledge on these

associations, it may be beneficial to design studies that aim to explore the direction and nature of these associations further. To develop a reliable understanding of the role of drinking identity, more studies in community samples are needed, and samples utilising male participants and other age groups would widen the evidence base. In addition, it may be beneficial to explore these relationships in a clinical sample of participants seeking treatment for alcohol difficulties. With this knowledge, evidence-based treatment approaches could consider the role of drinking identity in recovery from alcohol use disorders.

Associations between mental health symptoms and alcohol use were weak or non-significant, and inconsistent with past research. However, drinking identity emerged as a significant moderator of the relationship between depressive symptoms and hazardous alcohol use. It may be beneficial to replicate this research in a clinical sample of individuals diagnosed with depression or anxiety who consume alcohol, to further consider the role of drinking identity. Increased knowledge in a clinical sample may help the development of evidence-based treatment approaches that could consider the role of drinking identity in the treatment of mental health and co-morbid alcohol disorders.

Further research is needed to understand what alcohol content on SNSs can tell researchers and clinicians about the drinking behaviours of users. Research that seeks to observe SNS profiles objectively may reduce the risk of sample bias, if they can overcome the data protection and ethical issues associated with this research area. It may be beneficial to explore the motivations for displaying, or not

displaying, certain content and to assess whether privacy concerns may be resulting in a possible change in the types of content being displayed online. Qualitative research methods might be able to achieve an increased understanding of this.

Clinical Implications

This study found that hazardous alcohol use, binge drinking, and depressive and anxiety symptoms were highly prevalent. These high prevalence rates suggest that the risk of alcohol-related harm to young females in the community may be a public health concern. Efforts to reduce and prevent hazardous and harmful alcohol use and promote positive mental health in this population may be beneficial. This could be achieved through the continued use of health promotion campaigns aimed at the general population, which aim to reduce alcohol use (e.g. 'Change4Life') and improve mental health outcomes (e.g. 'Time for Change').

The findings of this study propose that drinking identity may be an important factor for clinicians to consider in their work with clients who engage in hazardous alcohol use or binge drink. As a cognitive construct, it is suggested that identity may influence behaviour. If an individual sees alcohol as a central part of their identity it may influence the likelihood of engaging in behaviours that are consistent with these cognitions. It may be important to take drinking identity in to account when supporting people to change their drinking behaviour because cognitive strategies that aim to reduce internalisation of drinking identity may

strengthen existing interventions that focus more on behavioural change (Lindgren, Ramirez, Namaky, Olin, & Teachman, 2016).

In addition, clinicians working with clients who experience co-morbid alcohol and mental health difficulties may benefit from considering whether their clients see alcohol as part of their identity, as this may influence the strength of the relationship between their co-morbid difficulties. Clinicians could begin to explore these concepts during their psychological assessment, and may benefit from establishing their clients level of drinking identity through self-report measures such as the ASC, or exploring these qualitatively. It is important to highlight that even low scores on the ASC are worth considering further, as even low levels of drinking identity may be related to increased drinking behaviours. In addition, although not direct findings of the current study, it is speculated that drinking identity may be an important factor in formulating a client's motivation to change, or possible barriers to change. Shifts in identity could play a key role in behavioural change, including that of alcohol use (Kearney & O'Sullivan, 2003). Interventions that have used behavioural strategies to encourage a change in identity away from associating as a 'drinker' have achieved reductions in alcohol use and AUDIT scores (Garnett, Crane, Brown, West, & Michie, 2016).

Finally, alcohol content on SNSs may provide a measure, albeit weak, of drinking behaviours. It is hypothesised that it may be beneficial for clinicians to explore with their clients the role of SNSs in their lives and whether alcohol plays a feature in their online presentation.

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VOLUME I

CHAPTER III: PUBLIC DISSEMINATION DOCUMENT

Public Dissemination Document

This document provides an accessible summary of Volume I of this thesis, including the systematic literature review and the research study.

Systematic Review:
Can Social Networking Site Content Inform Researchers about the Psychopathology and Personality Traits of the User?

Background

If used effectively, social media could offer significant value to the National Health Service (NHS Providers, 2014). Over recent years, technologies have been trialled on Social Networking Sites (SNSs) that aim to monitor mental state and support individuals experiencing distress (e.g. 'Samaritans Radar'; Samaritans, 2015). These methods offer new ways of supporting people online, but they have faced difficulties in protecting people's data and accurately reaching those in need of support. Considering questions such as: 'how do we know if someone online needs support?' and 'can we tell if someone is experiencing psychological distress from the content they put on SNSs?' could help researchers develop effective online tools to identify and reach people in need of support.

Aims

This systematic review aimed to answer the research question 'can social networking site content inform researchers about the psychopathology and personality traits of the user?'.

Methods

Four databases; PsycINFO, Web of Science, CINAHL, and ProQuest Social Sciences Premium Collection, were searched using key words relating to 'content', 'social media', and 'psychopathology' or 'personality'.

Results

The search identified 1180 records. Records were reviewed against inclusion and exclusion criteria. 24 studies were identified for inclusion in the review. The quality of each study was assessed using the 'National Institute for Health and Care Excellence quality appraisal checklist for quantitative studies reporting correlations and associations' (NICE, 2012).

Main Findings

- Individuals experiencing psychological distress might post written content on SNSs containing negative emotions or words (more evident in under 25-year-olds and females), health complaints and requests for support (more evident in

females), and references to depression (more evident for those with self-reported depressive symptoms rather than a diagnosis).

- Individuals with higher narcissist personality traits might post 'self-promotional' content on SNSs, emphasising positive attributes (more evident in pictures for females and text for males), and more 'selfies' (a self-portrait photograph), however, the relationship was complex between types of selfies and subtypes of narcissism.
- Individuals with higher neurotic personality traits, often elevated in clinical samples, may post content on SNSs containing negative words, swear words, and first-person singular pronouns (e.g. 'I', 'me', 'mine').
- Individuals with higher openness to experience and introversion, and lower agreeableness and conscientiousness (often characterising a range of mental health difficulties) may post words and phrases on SNSs consistent with the characteristics of their personality traits.

Conclusions and Implications for Research and Clinical Psychology

SNS content may be able to inform researchers about the psychopathology and personality traits of the user. However, there were concerns about the quality of the research evidence and therefore findings must be interpreted with caution. More research is needed to develop a more complete understanding of this research area. Future studies should aim to reduce the subjective measurement of variables, include confounding variables, obtain participant samples that are representative of SNS users, and explore psychopathology on websites other than Facebook. Public health campaigns or psycho-educational material could be

targeted online to individuals at risk of experiencing psychological distress based on the content they present online, however, ethical issues would need to be considered. Given the high proportion of individuals accessing SNSs several times a day (Department for Culture, Media, and Sport, 2016; Ofcom, 2016), online settings may play an important role in many people's lives. Clinicians working in face-to-face settings may wish to consider how the individuals they work with present online. It may be beneficial if clinical assessment protocols included questions about SNS use to ensure this topic is discussed if relevant to the client. In addition, standardised assessment measures that assess online behaviours or problematic Internet or SNS use (e.g. the Psycho-Social Aspects of Facebook Use Questionnaire; Bodroza, & Jovanovic, 2016) could be useful.

Research Study:
Drinking Identity and Alcohol Use in Young Females: The Relationships Between Mental Health and Displaying Alcohol in Social Networking Site Pictures

Background

If an individual strongly identifies with a specific behaviour, they might be more likely to engage in that behaviour (Charng, Piliavin, & Callero, 1988; Fekadu & Kraft, 2001). Drinking identity is the extent to which a person thinks of himself or herself as a 'drinker' (Conner, Warren, Close, & Sparks, 1999). Research has found that students with a greater drinking identity drink more alcohol (e.g. Foster, Neighbors, & Young, 2014; Foster, Yeung, & Quist, 2014; Gardner, de Bruijn, & Lally, 2012). Research has also found that individuals who display references to

alcohol on their SNSs, sometimes considered 'online drinking identity', drink more alcohol (e.g. Moreno, Arseniev-Koehler, Litt, & Christakis, 2016; Moreno, Christakis, Egan, Brockman, & Becker, 2012; Ridout, Campbell, & Ellis, 2012; Rodriguez, Litt, Neighbors, & Lewis, 2016).

A large percent of the general population, particularly young adults, drink high amounts of alcohol (Office for National Statistics, 2016). Alcohol use in females can have effects on reproductive health outcomes, pregnancy health outcomes, and other physical and mental health outcomes, and the risk of alcohol-related harm to females is considered a public health concern (World Health Organisation, 2014).

Aims

The study aimed to explore the relationships between drinking identity, alcohol use, and mental health, in a community sample of young females. To also explore the presence of alcohol content in participant's SNS pictures, via self-report and by obtaining a copy of participant's SNS profile pictures.

Methods

Participants. 398 female participants aged 18 to 24 years old (M = 20.08, SD = 2.11) were recruited on Facebook via snowball and opportunity sampling. 142 of these participants provided their SNS profile picture.

Materials. Participants were asked the UK definition of binge drinking: *"in the past two weeks have there been any occasions where you have drank six or more units of alcohol in one sitting?"*. Participants completed the Alcohol Use Disorders Identification Test (AUDIT; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993), Alcohol Self-Concept Scale (ASC; Lindgren et al., 2013), Patient Health Questionnaire-9 (PHQ-9; Kroenke, Spitzer, & Williams, 2001), and Generalised Anxiety Disorder-7 Questionnaire (GAD-7; Spitzer, Kroenke, Williams, & Löwe, 2006). Finally, participants were asked *"with regards to your most frequently used social networking site, are there any pictures of you on this site with alcohol in them?"*.

Procedures. Potential participants were provided with a link to the online survey via Facebook. Participants completed a set of questionnaires and were asked to upload their SNS profile picture. Scores on each measure were calculated and profile pictures were categorised into 'alcohol content' or 'no alcohol content'. Statistical analysis was conducted using SPSS version 24 and RStudio (RStudio Team, 2015).

Main Findings

- Young females with a greater drinking identity engaged in greater hazardous alcohol use and were more likely to binge drink.
- Young females with greater symptoms of depression and anxiety engaged in greater hazardous alcohol use but were not statistically more likely to binge drink.

- When young females who experienced greater depressive symptoms also had a greater drinking identity, they engaged in even greater hazardous alcohol use compared to those with a lower drinking identity.
- Drinking identity did not influence the strength of the relationship between anxiety symptoms and hazardous alcohol use in young females.
- Young females who self-reported having alcohol content in pictures on their SNS profiles engaged in greater hazardous alcohol use and were more likely to binge drink.
- Young females who had alcohol content in their SNS profile pictures engaged in greater hazardous alcohol use but were not statistically more likely to binge drink, however, only 10.56% of uploaded profile pictures contained alcohol content and statistical analysis on this sample may have been unreliable.

Conclusions and Implications for Research and Clinical Psychology

Drinking identity may be important for clinicians to consider when working with individuals who drink high amounts of alcohol, and also with those who experience both alcohol use difficulties and mental health difficulties. Future studies could explore the direction and nature of this relationship further and use different participant samples (additional community samples, males, clinical samples of participants seeking treatment for alcohol use or mental health difficulties). It may be helpful if clinicians consider drinking identity as part of their psychological assessment, using measures such as the ASC scale and taking note that even low scores on this measure may be important. Alcohol use reduction and prevention

efforts may benefit from considering drinking identity, as shifts in identity could play a role in behavioural change.

Further research is needed to understand what alcohol content in SNS pictures can tell researchers and clinicians about the drinking behaviours of users. It may be useful for clinicians to explore with their clients the role SNSs play in their lives, and whether alcohol plays a feature in how they present themselves online.

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VOLUME I

APPENDICES

Appendix A

List of Facebook Groups Used to Advertise the Study

Facebook group	Number of advertisements			
	July 2016	Aug 2016	Sept 2016	Oct 2016
Actors UK	3	2	1	2
Advertise Promote Recruit No Rules UK	3	5	2	1
Aviemore & Spey Valley Community Issues Forum				1
Ayia Napa 2017		1	2	2
Bangor Buy And Sell		3	2	2
Birmingham Clubbers		1	2	1
Birmingham Students Buy/Sell/Trade				1
Bridlington Today (chat)				1
Brighton Bartenders Association (BNBA)				1
Bristol Cyclists				1
Cambridgeshire, Peterborough, London, Kings Lyn, Spalding Buy And Sell Facebay				1
Cardiff Freeads		3	2	2
Cardiff Mums				2
Debates And Chat	3	4	1	2
Edinburgh Social Network				1
Express Your Self	3	5	2	2
Glasgow Can Post Just About Anything				2
High Achieving Women	1	2		
Ibiza Workers 2016 (Real Workers Group)		2	2	3
Inspirational Business Network	3	5		
Inverness New Buy Swap N Sell				
Kavos 2017		3	3	
Kings Lynn For Sale (No Rules)				1
Kavos Workers Family 2017 (Official)				2
Ladies Forum*		3	2	2
Leicester Runners				1
Little Mix Fans	4	4	1	1
Magaluf 2017 - Everything Magaluf!		2	2	1
Magaluf Workers		3	2	1
Manchester Nightlife		1	2	2
Manchester Tickets		1	2	1
Mr Pinky The Travelling Cat!	3			
North West Car Corral The UK's First Car Corral				2
Nottingham Freshers 2016-2017				1
Official Stirling Freshers 2016				2
One Direction (1d)	3	5	2	
Peacehaven Gossip!				1
Plymouth University Freshers 2016				1

Facebook group	Number of advertisements			
	July 2016	Aug 2016	Sept 2016	Oct 2016
Promotion Staff (The Group That Helps Us All In The Industry!)	2	4		1
Psychology Research - Promoting Online Participation & Resources	3		1	
Stoke-On-Trent Jobs				1
Students of Oxford Swap (Shop)		2	2	
Swansea University Freshers 2017 - 2018		3	2	2
Swindon Bikers				1
The Talented Woman - Tips For Success				
UK Political Forum Group	2	2		
University Of Exeter Freshers 2016				2
University Of St Andrews Class Of 2020		3	2	3
Womens Advice Group	2	4	2	2
Working In Magaluf 2017		3		

UNIVERSITY OF BIRMINGHAM

Appendix B

Study Participant Information Sheet (V5 17/06/2016)

Study Title

Binge Drinking, Drinking Identity on Social Networking Sites, and Mental Health in Young Females

Researchers

Ms Rachel Joiner, Trainee Clinical Psychologist, University of Birmingham

Dr Hermine Graham, Consultant Clinical Psychologist & Lecturer, University of Birmingham

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We would like to invite you to take part in a research study. Before you decide whether you want to take part, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully.

What is the purpose of the study?

This study is a student research project being run by Rachel Joiner as part of the Clinical Psychology Doctorate at the University of Birmingham. This study aims to learn more about alcohol use in females aged 18 to 24 years old. We are interested in young females in particular because surveys have found that some young females drink large amounts of alcohol in one sitting. Alcohol use can have effects on health, and can increase risk-taking behaviours, so it is important for us to understand more about what impacts on alcohol use. This study is interested in binge drinking in particular, which for female's means drinking six or more units of alcohol in one sitting.

We are interested in how young females display alcohol in their pictures on social networking sites such as Facebook and Twitter, and how this is related to the

amount they drink. We are also interested in how mental health affects profile pictures on social networking sites and the amount of drinking.

Why have I been invited to take part?

Potential participants must be female, aged 18 to 24 years old, a user of a social networking site and living in the United Kingdom. If you do not meet these requirements then unfortunately you cannot take part in this study and thank you for your time. This study is hoping to find between 120 and 170 females to take part.

Do I have to take part?

Your participation in this study is completely voluntary and you do not have to take part if you do not want to. It is up to you to decide whether or not you want to take part. If you do, you will be asked to consent to take part.

What will happen to me if I take part?

If you decide to take part you will be asked to complete an online survey. This should not take any longer than between 15 and 25 minutes to complete.

The online survey will require you to:

- Answer general questions about yourself, such as your age, ethnicity and employment status
- Answer questions about your use of alcohol
- Answer questions about your mental health
- Answer questions about your use of social networking sites
- Upload your current profile picture of your most frequently used social networking site. This might be Facebook or Twitter for example, whichever social networking site you use most

What are the possible disadvantages and risks of taking part?

During participation in this study, you will not encounter any greater risks of discomfort than those incurred in routine daily activities, although you may find some questions of a sensitive nature, and you are free to leave these blank if you

wish. At the end of the study you will be provided with contact information for support services that you can access if you have been affected by any of the content in this study.

What are the possible benefits from taking part?

You will not receive any direct benefits from taking part in this study. Your participation may, however, provide useful information about the relationship between binge drinking, mental health and identity on social networking sites.

What happens when the research study stops?

We will be happy to provide you with a report of the study findings, when this becomes available. If you would like a copy of our report or any other details regarding the study, please ask.

Will my taking part in the study be kept confidential?

The procedure for handling, processing, storing and destroying your data during this study is compliant with the Data Protection Act 1998.

All information that is collected about you during the course of the research will be kept strictly confidential. All of your information will be kept securely on the University of Birmingham server and will be coded with a unique participant number. Your information will be used for this study only and will not be shared with anyone else or used for any other reason. Your electronic data will be anonymous and kept for 10 years before being destroyed in accordance with guidelines from the American Psychological Association and the University of Birmingham.

What will happen if I don't want to carry on with the study?

When filling in the questionnaire you can stop at any stage without your responses being saved or used. Once you have submitted your responses your data will not be identifiable and you will therefore not be able to withdraw from the study.

What will happen to the results of the study?

The results of the research will be written up by Rachel Joiner as part of a thesis. This is required as part of the Clinical Psychology Doctorate at the University of Birmingham. The findings may also be published in scientific journals. You will not be identified in any report or publication.

What if I have any concerns?

If you have a concern about any aspect of this study, you should email the researchers who will do their best to answer your questions (rxj470@bham.ac.uk).

Contact Details

If you would like to discuss any aspect of this research please contact:

Email: rxj470@bham.ac.uk

Post: Rachel Joiner, School of Clinical Psychology, Department of Psychology, University of Birmingham, Edgbaston, Birmingham, B15 2TT.

UNIVERSITY OF BIRMINGHAM

Appendix C

Study Consent Form (V2 27/11/2015)

Study Title

Binge Drinking, Drinking Identity on Social Networking Sites, and Mental Health in Young Females

Researchers

Ms Rachel Joiner, Trainee Clinical Psychologist, University of Birmingham

Dr Hermine Graham, Consultant Clinical Psychologist & Lecturer, University of Birmingham

1. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time up until October 2016, without giving any reason, without my legal rights being affected. ☐

3. I understand that the data collected about me during the study will be looked at by the researchers. I understand that my data may also be looked at by responsible individuals from the University of Birmingham for the purpose of supporting data analysis. ☐

4. I agree to take part in the above study. ☐

Appendix D

Study Online Survey (V2 17/06/16)

Demographic Information

1. What is your age: ……. years old

2. Please tick your ethnicity:

White

1. British □
2. Irish □
3. Other White Background □

Asian

4. Indian □
5. Pakistani □
6. Bangladeshi □
7. Other Asian Background □

Black

8. Caribbean □
9. African □
10. Other black background □

Mixed

11. White and Black Caribbean □
12. White and Black African □
13. White and Asian □
14. Other Mixed Background □

Other Ethnic Groups

15. Chinese □
16. Other Ethnic Group (specify) ……

3. Please tick the region you currently live in:

England

1. North East □
2. North West □
3. Yorkshire and the Humber □
4. East Midlands □
5. West Midlands □
6. East of England □
7. London □
8. South East □
9. South West □
10. **Wales** □
11. **Scotland** □

4. Please tick your religious cultural tradition:

1. No Religion □
2. Christian □
3. Muslim □
4. Hindu □
5. Sikh □
6. Other (specify) ……

5. What educational qualifications have you received?

0. No qualifications □
1. GCSE/ NVQ level 1 or 2 □
2. A-level/ GNVQ/ BTEC/NVQ level 3 □
3. Degree/ HND/ NVQ level 4 or above □
4. Special Needs Educational Qualifications □

6. Please tick your employment status:

1. Working (Paid) □
2. Working (Voluntary) □
3. Unemployed □
4. Home maker □
5. Student □
6. Sheltered employment □
7. Other (specify) ……

7. Please tick your marital status:

1. Married and cohabiting □
2. Married but separated □
3. Cohabiting less than 2 years □
4. Cohabiting longer than 2 years□
5. Single □
6. Divorced □
7. Widowed □

8. Please tick your living status:

1. Alone □
2. With parents/guardians □
3. With partner □
4. Other (specify) □

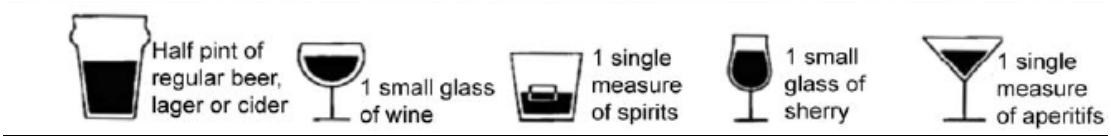
9. Do you have children?

0. No children □
1. Children – no contact at all □
2. Children – not in regular contact (less than once per week) □
3. Children – in regular contact (at least once per week) □
4. Children – living with you □

Alcohol-Related Questions

The guide below explains how many units of alcohol are in drinks. Please use this when answering the following questions.

This is one unit of alcohol…



…and each of these is more than one unit

10. How old were you when you first consumed alcohol?

…… years old

I have never consumed alcohol □

11. In the past two weeks have there been any occasions where you have drank 4 or more units of alcohol in one sitting?

Yes □

No □

12. How old were you when you first consumed 4 or more units of alcohol in one sitting?

…… years old

I have never consumed alcohol □

13. In the past two weeks have there been any occasions where you have drank 6 or more units of alcohol in one sitting?

Yes □

No □

14. How old were you when you first consumed 6 or more units of alcohol in one sitting?

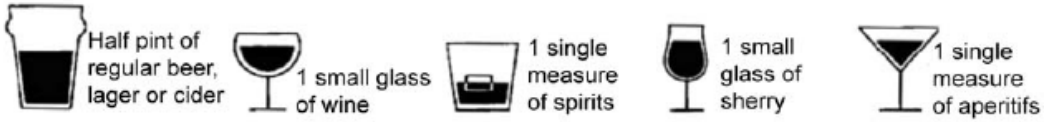
…… years old

I have never consumed alcohol □

Alcohol Use Disorders Identification Test (AUDIT)

The guide below explains how many units of alcohol are in drinks. Please use this when answering the following questions.

This is one unit of alcohol…



…and each of these is more than one unit

15. How often do you have a drink containing alcohol?

Never (Skip to question 9) □

Monthly or less □

2 to 4 times a month □

2 to 3 times a week □

4 or more times a week □

16. How many drinks containing alcohol do you have on a typical day when you are drinking?

1 or 2 □
3 or 4 □
5 or 6 □
7, 8, or 9 □
10 or more □

17. How often do you have six or more drinks on one occasion?

Never □
Less than monthly □
Monthly □
Weekly □
Daily or almost daily □

18. How often during the last year have you found that you were not able to stop drinking once you had started?

Never □
Less than monthly □
Monthly □
Weekly □
Daily or almost daily □

19. How often during the last year have you failed to do what was normally expected from you because of drinking?

Never □
Less than monthly □
Monthly □
Weekly □
Daily or almost daily □

20. How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?

Never □
Less than monthly □
Monthly □
Weekly □
Daily or almost daily □

21. How often during the last year have you had a feeling of guilt or remorse after drinking?

Never □
Less than monthly □
Monthly □
Weekly □
Daily or almost daily □

22. How often during the last year have you been unable to remember what happened the night before because you had been drinking?

Never □
Less than monthly □
Monthly □
Weekly □
Daily or almost daily □

23. Have you or someone else been injured as a result of your drinking?

No □
Yes, but not in the last year □
Yes, during the last year □

24. Has a relative or friend or a doctor or another health worker been concerned about your drinking or suggested you cut down?

No □

Yes, but not in the last year □

Yes, during the last year □

Alcohol Self-Concept Scale (ASC)

For each of the following items, indicate how much you agree or disagree with the given statement.

	Strongly Disagree			Neither agree nor disagree			Strongly Agree
	-3	-2	-1	0	1	2	3
25. Drinking is part of my self-image							
26. Drinking is part of “who I am”							
27. Drinking is a large part of my personality							
28. Drinking is a large part of my daily life							
29. Others view drinking as part of my personality							

Mental Health-Related Questions

Patient Health Questionnaire-9 (PHQ-9)

Over the last 2 weeks, how often have you been bothered by any of the following problems?

Please put a tick in the box to indicate your answer

	Not at all	Several days	More than half the days	Nearly every day
30. Little interest or pleasure in doing things				
31. Feeling down, depressed, or hopeless				
32. Trouble falling or staying asleep, or sleeping too much				
33. Feeling tired or having little energy				
34. Poor appetite or overeating				
35. Feeling bad about yourself - or that you are a failure or have let yourself or your family down				
36. Trouble concentrating on things, such as reading the newspaper or watching television				
37. Moving or speaking so slowly that other people could have noticed? Or the opposite — being so fidgety or restless that you have been moving around a lot more than usual				
38. Thoughts that you would be better off dead or of hurting yourself in some way				

39. If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?

Not difficult at all □

Somewhat difficult □

Very difficult □

Extremely difficult □

Generalised Anxiety Disorder-7 (GAD-7) Questionnaire

Over the last 2 weeks, how often have you been bothered by any of the following problems?

Please put a tick in the box to indicate your answer

	Not at all	**Several days**	**More than half the days**	**Nearly every day**
40. Feeling nervous, anxious or on edge				
41. Not being able to stop or control worrying				
42. Worrying too much about different things				
43. Trouble relaxing				
44. Being so restless that it is hard to sit still				
45. Becoming easily annoyed or irritable				
46. Feeling afraid as if something awful might happen				

Social Networking Site Questions

47. Which social networking sites do you use (please select as many as you use)?

Facebook □
Myspace □
Twitter □
Instagram □
LinkedIn □
Friendster □
Hi5 □
Habbo □
Tumblr □
Flickr □
Google+ □
Other (please specify) ……

48. Which social networking site do you use the most frequently (please only select one)?

Facebook □
Myspace □
Twitter □
Instagram □
LinkedIn □
Friendster □
Hi5 □
Habbo □
Tumblr □
Flickr □
Google+ □
Other (please specify) ……

Please answer the following questions in relation to your most frequently used social networking site:

49. Approximately how often do you use this site?

- Several times a day □
- Once a day □
- Several times a week □
- Once a week □
- Once a month □
- Less than once a month □

50. Approximately how many friends/connections do you have on this site? ……

51. Are there any pictures of you on this site with alcohol in them?

- Yes □
- No □

52. Please upload the profile picture you have now on your most frequently used social networking site

Appendix E
Study Debrief Information (V2 17/06/16)

Research has found that students often see alcohol as a central part of their identity, for example, identifying as a 'drinker'. In research this has been called 'drinking identity'. Research has found that students with a higher drinking identity drink more alcohol. Research has also found that students frequently have an online drinking identity on social networking sites such as Facebook and Twitter. This means that students often display alcohol in their pictures and in written text, to present alcohol as a part of their identity online. Research has found that students who display more alcohol on their social networking sites drink more.

This study will investigate whether this relationship is also seen in a general population of students and non-students. This study focuses on females in particular, because a large number of females drink alcohol, with the rate of alcohol use in males reducing more than in females in recent years. This study is also interested in whether mental health symptoms impact on the relationship between drinking identity and alcohol use. This is important because research has found that mental health symptoms and alcohol use are often linked.

Thank you for your participation in this study. Your information will be kept securely and confidentially. If you indicated that you would like information about the findings of the study then we will be in contact as soon as these become available.

Below is a list of contact details for support services that you can access if you have been affected by any aspect of this study. If you have any further questions or concerns, please do not hesitate to contact me, Rachel Joiner, by emailing rxj470@bham.ac.uk.

Support Services for Mental Health

Rethink Mental Illness

Support and advice for people living with mental illness

Phone: 0300 5000 927 (Mon-Fri, 10am-2pm)

Website: www.rethink.org

Samaritans

Confidential support for people experiencing feelings of distress or despair

Phone: 08457 90 90 90 (24-hour helpline)

Website: www.samaritans.org.uk

Sane

Charity offering support and carrying out research into mental illness

Phone: 0845 767 8000 (daily, 6pm-11pm)

Website: www.sane.org.uk Email: sanemail@org.uk

Mind

Promotes the views and needs of people with mental health problems

Phone: 0300 123 3393 (Mon-Fri, 9am-6pm)

Website: www.mind.org.uk

Support Services for Alcohol

Alcoholics Anonymous (AA)

A group of people sharing their experience of alcohol addiction to help themselves and others recover

Phone: 0800 9177 650 (24-hour helpline)

Website: www.alcoholics-anonymous.org.uk

Email: help@alcoholics-anonymous.org.uk

Drinkline

A free and confidential helpline for people who are concerned about their drinking or someone else's

Phone: 0800 7 314 314 (8am to 11pm everyday)

Alcohol Concern

For information about alcohol and your nearest alcohol advice centre

Phone: 0300 123 1110 (weekdays 9am-8pm, weekends 11am-4pm)

Website: www.alcoholconcern.org.uk

Talk to Frank

National drugs awareness site for young people and parents/carers

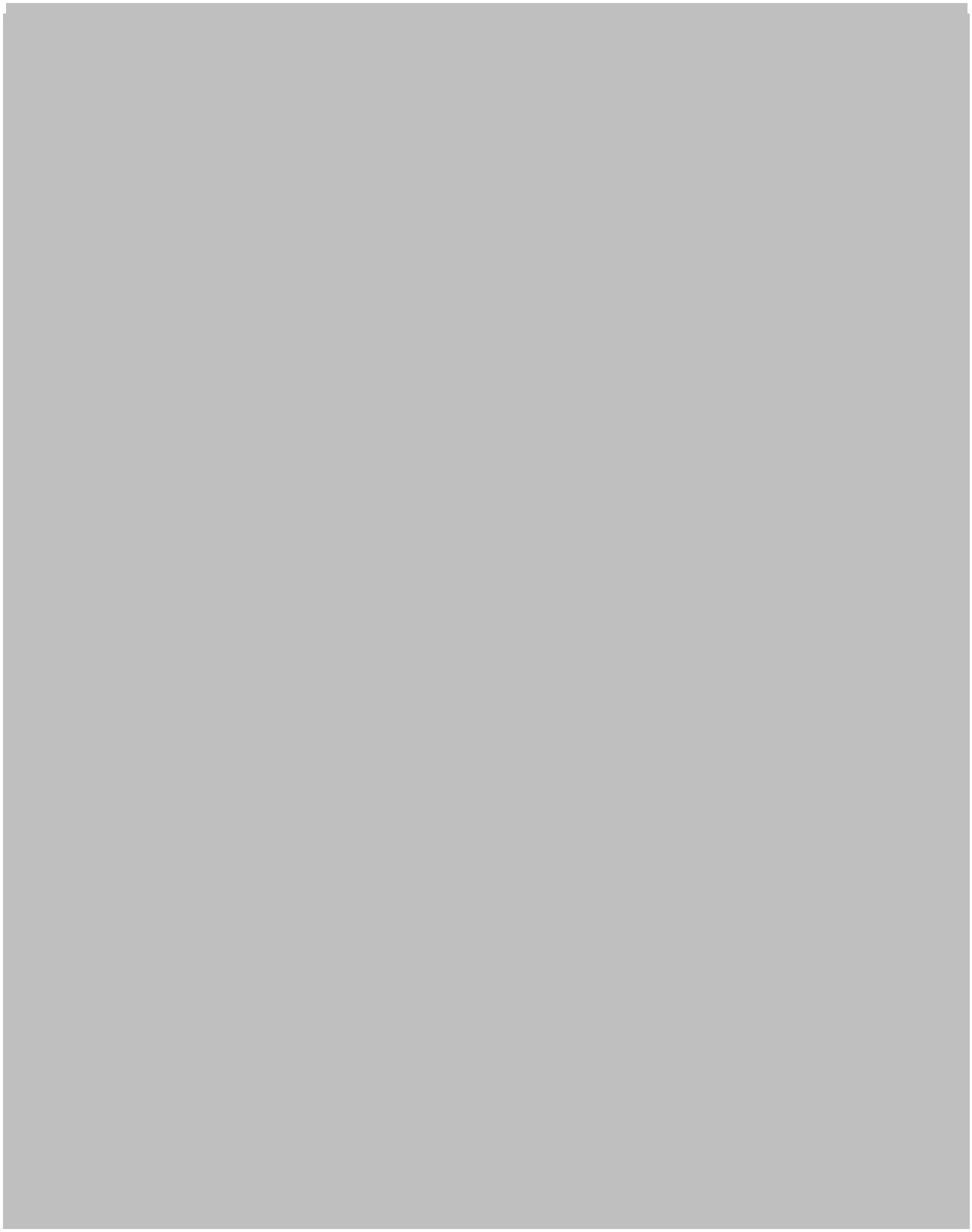
Phone: 0300 123 6600 (24-hour helpline)

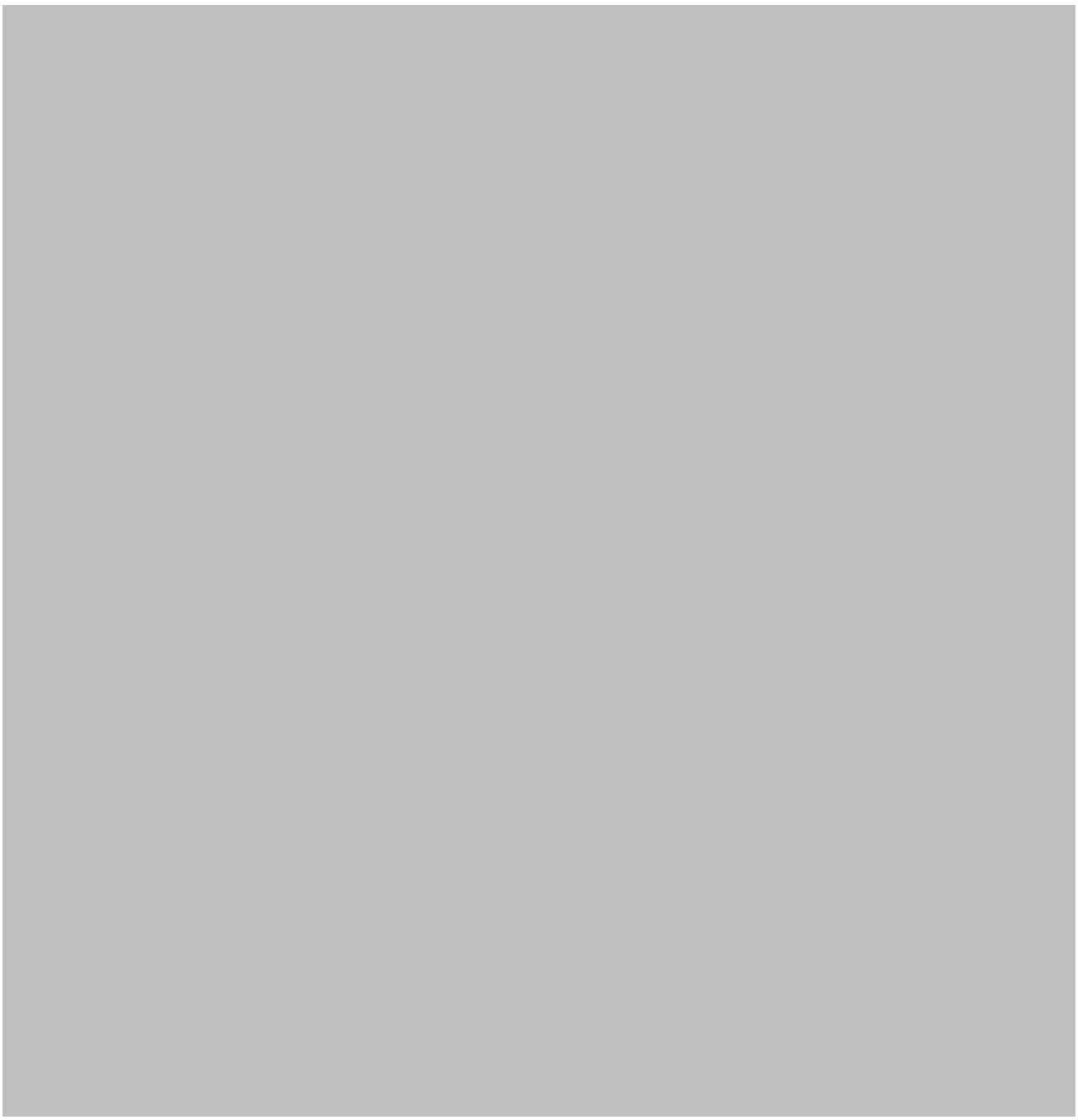
Website: www.talktofrank.com (friendly, confidential online chat daily 2pm-6pm)

Need a quick answer? Text 82111 a question and FRANK will text you back

Appendix F

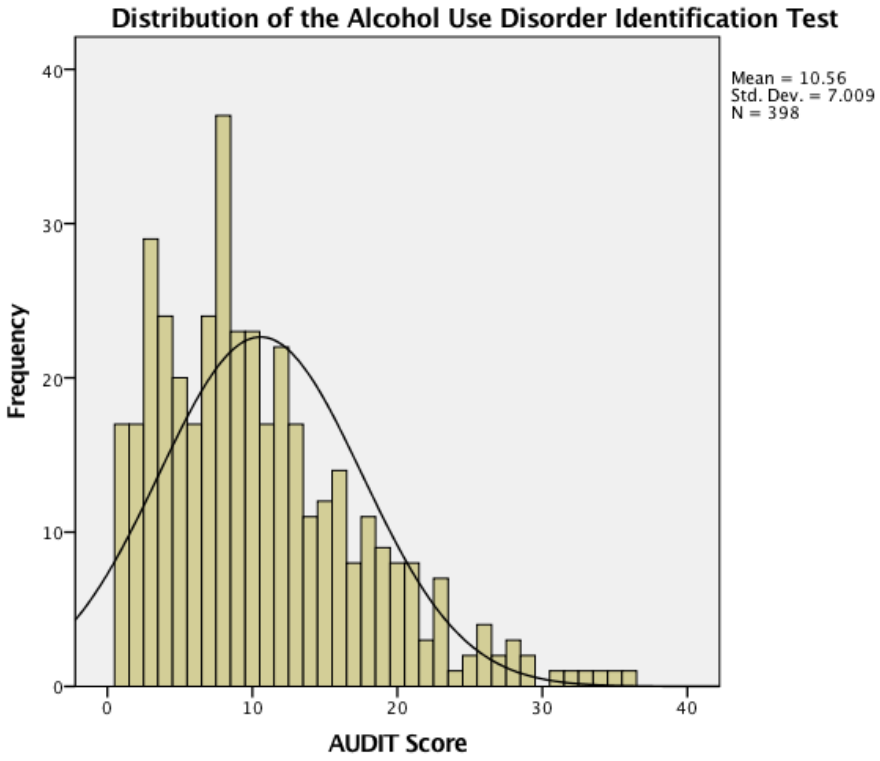
Proof of Ethical Approval for the Study

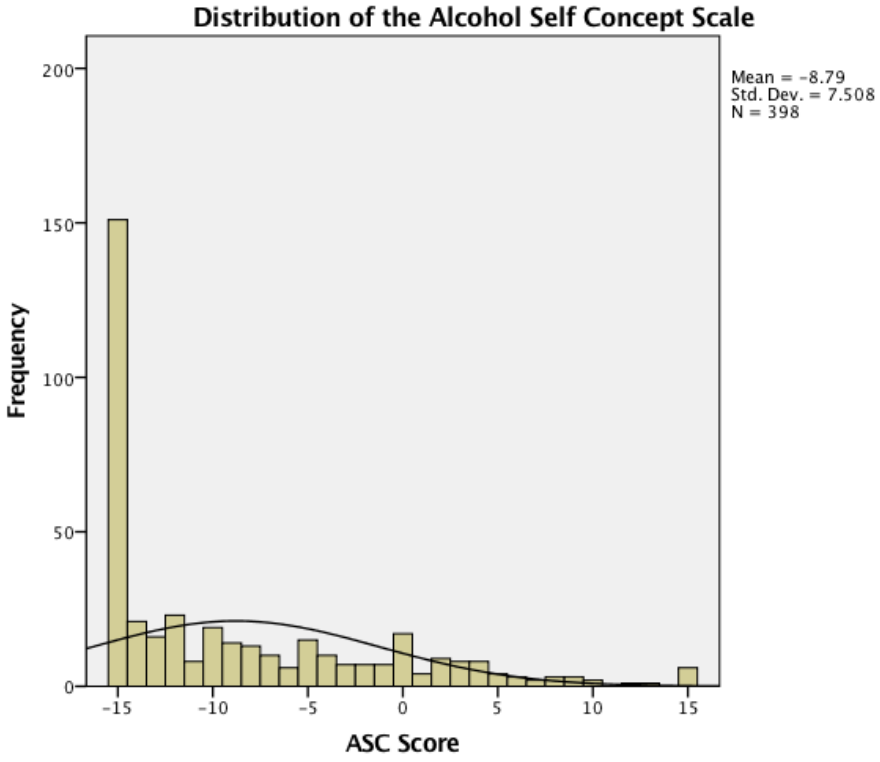


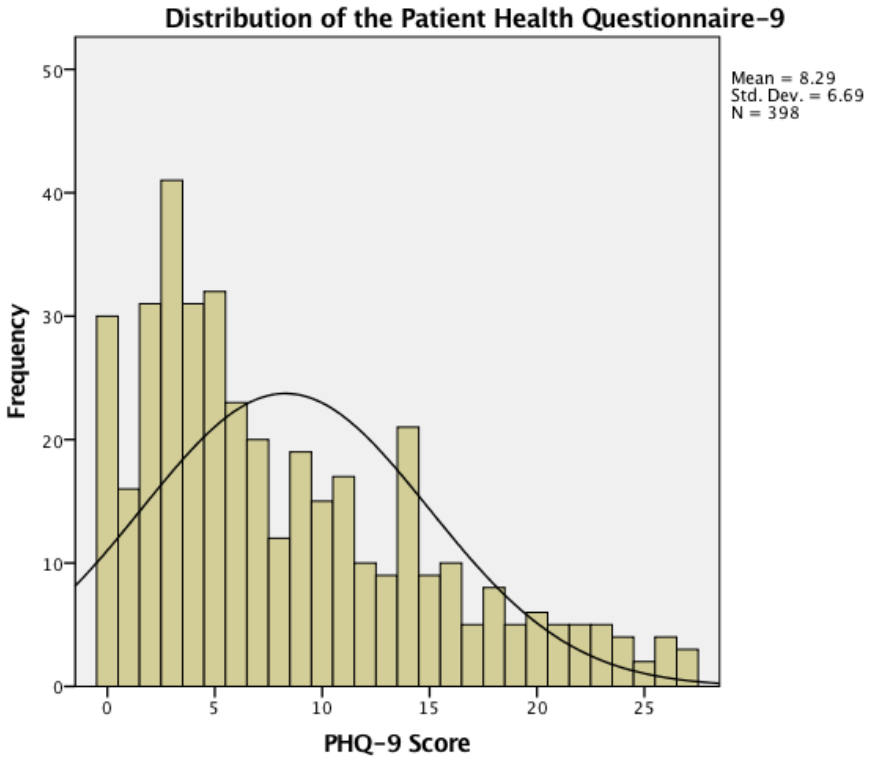


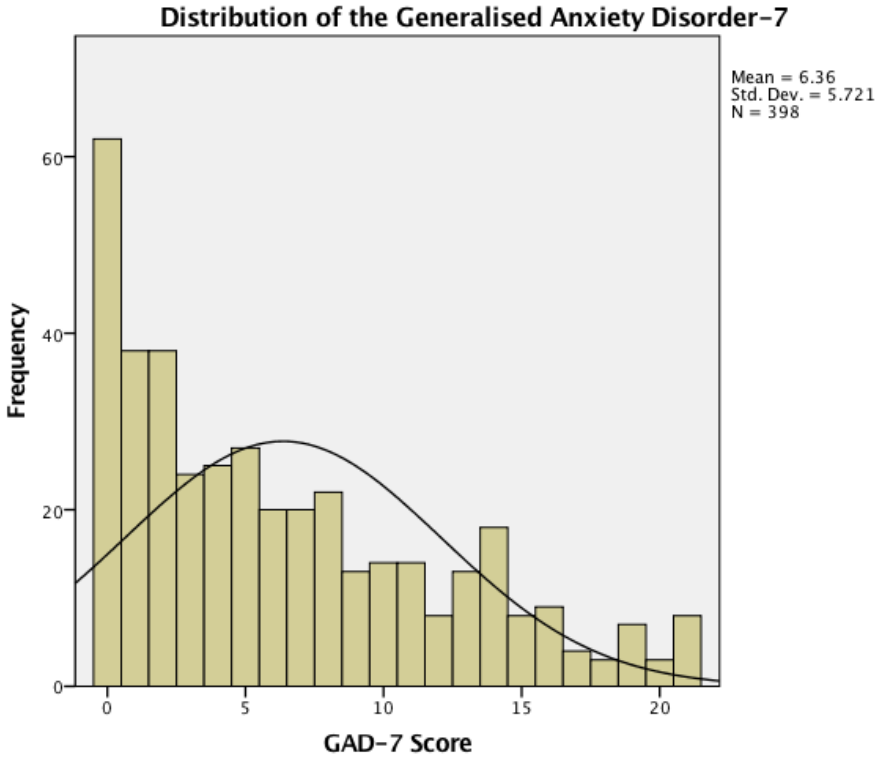
Appendix G

Distribution of Study Measures






Distribution of the Patient Health Questionnaire-9
Mean = 8.29
Std. Dev. = 6.69
N = 398
Frequency
PHQ-9 Score


Distribution of the Generalised Anxiety Disorder-7
Mean = 6.36
Std. Dev. = 5.721
N = 398
Frequency
GAD-7 Score